THE *Soybean Digest*

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GEO. M. STRAYER, Editor KENT PELLETT, Managing Editor

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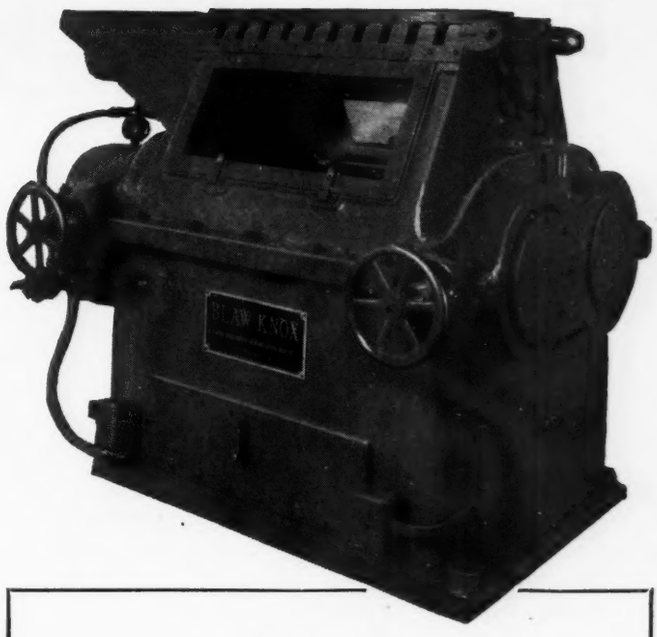

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EDITOR'S DESK

Continue Fats & Oils Statistics A bill authorizing the monthly collection of fats and oils data in the U. S. by the Bureau of the Census was passed by both Houses of Congress during the closing days of the late session and sent to the President for his signature. Our understanding is that the bill was to be signed and become law.

The Act will make it possible for the Census Bureau to continue the reports on production, stocks, distribution and consumption of fats and oils which were issued during the war and since. These reports would have been discontinued shortly by the Bureau without specific authorization from Congress.

The Act is an amendment to a law passed in 1916 which provided for the collection of monthly statistics concerning the cottonseed industry alone. The law was requested by the cottonseed industry to bring about more orderly marketing, at a time when cottonseed constituted about 80 percent of the total vegetable oils in this country. The law is now extended to cover other fats and oils including animal fats.

Among products included are cottonseed, soybeans, peanuts, flaxseed, corn germs, copra, sesame seed, babassu nuts and kernels and other oilseeds both crude and refined; and animal fats and oils and greases, fish and marine mammal oils.

Periodic reports by mills processing fats and oils are compulsory under the law. Responsible individuals failing to comply are subject to $1,000 fine.

It was the feeling of individuals and organizations backing the bill that the publication of complete statistics on fats and oils will bring about more orderly marketing and make possible fairer and more stable prices.

Shall We Export Whole Soybeans? Governmental officials in the fats and oils branch of Production and Marketing Administration, U. S. Department of Agriculture, will sooner or later be faced with the decision as to whether whole soybeans will be allowed to leave the country in appreciable quantities. With the harvest of the 1947 crop that decision will be imminent!

Last June representatives of the soybean, cottonseed and peanut industries—the three edible oil industries of the United States—met with Secretary of Agriculture Anderson pertaining to the granting of export controls on protein meals. A representative of the board of directors of the American Soybean Association, Mr. Ersel Walley, was present at that meeting. Action was delayed until July and August crop reports were in. It was agreed that if the 1947 soybean and cottonseed crops appeared assured, some relaxation of export controls would be desirable. Whether that relaxation will be on protein meals alone, or on whole soybeans also, must be decided.

Processors of soybeans would naturally prefer that only meal be allowed to leave the country, that the bean crop be retained here for processing. Their position is much the same as that of the wheat millers in the recent discussion on the exporting of wheat as compared with flour exports.

Word reaches us just as we go to press that a meeting of representatives of all associations representing the fats and oils industry will be held in Washington on August 25 to discuss the current fats and oils situation, the available supply for domestic consumption, and the export policy for the 1947-48 year. The American Soybean Association will have representation at the meeting, and a report will be carried in the September issue of the *Soybean Digest*.

Will Reopen Hearings on Bread Standards Welcome news to the soybean industry is the pronouncement that hearings on the standards for white bread, as promulgated by the Food and Drug Administration, will be reopened some time next year.

During the war years soy flour has been allowed to enter white bread in quantities up to 3 percent under a ruling of the administrator of the Federal Security Agency. With the return to a peacetime economy, it had been proposed that the previous standards, allowing the use of only .5 percent of soy flour in white bread, would again apply. It is anticipated that new evidence and data will be presented to substantiate the continued inclusion of up to 3 percent soy flour.

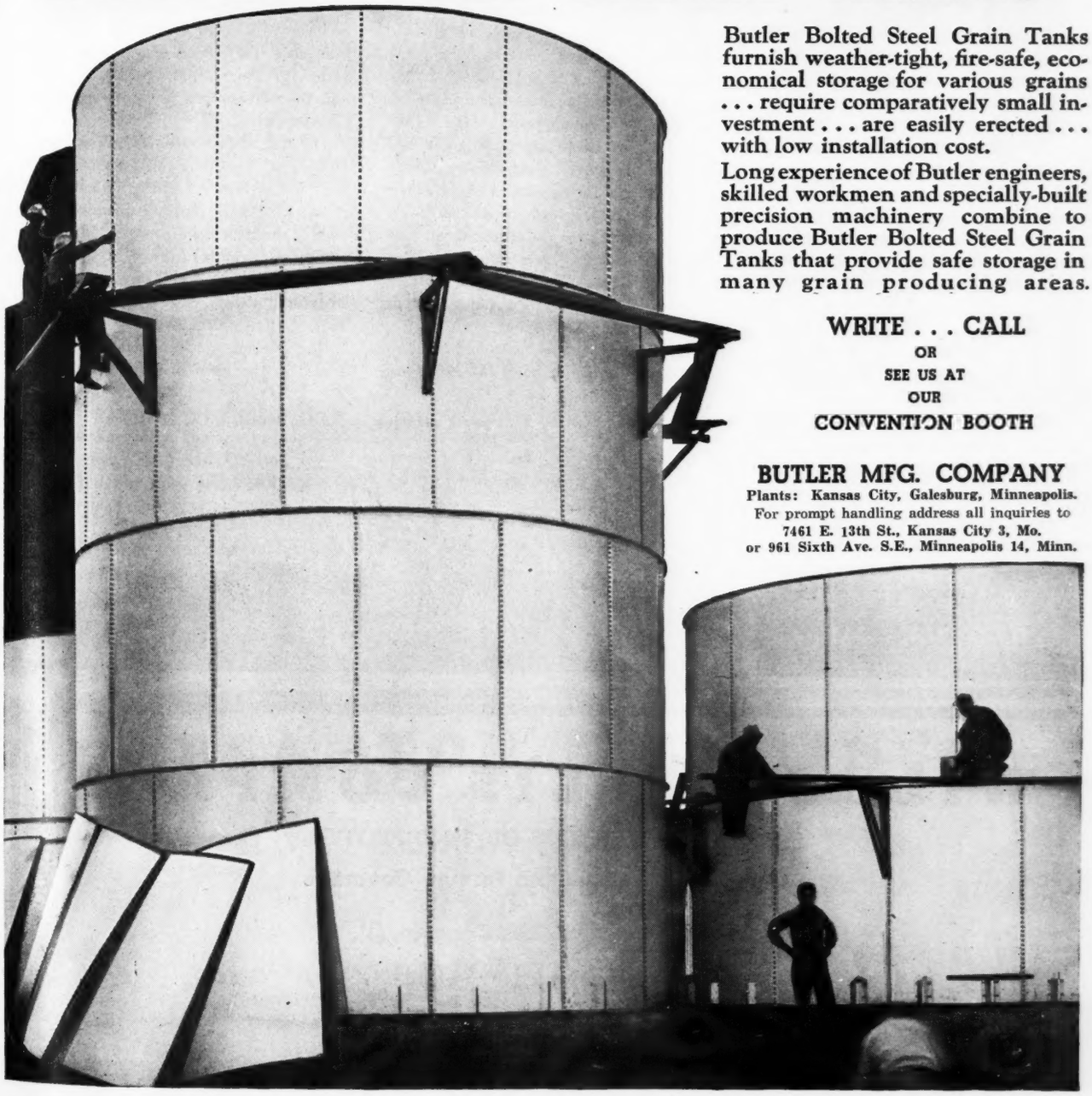
And if a suggestion is in order—directed to the soy flour manufacturers—we have one to offer.

Why is not soy bread more popular over the country? Certain bakeries have been offering a specialty soy loaf for years, with good success. Would it not be possible to develop, in the bakery kitchens maintained by the soy flour manufacturers, a distinctive soy loaf, highly nutritious because of higher protein, tasty—something which might find favor among large numbers of the consuming public? Would not such a distinctive loaf have merit, offer an important market for soy flour, along with the inclusion of small amounts in white bread? Is not soy flour distinctive enough in its flavors, its baking qualities, its aroma, its high protein content, that the housewife would welcome a nutritious addition to the daily diet of the staff of life?

September Is Annual Issue The September issue of the *Soybean Digest* will again be our special convention issue, carrying the full report on the 27th annual convention of the American Soybean Association which is being held at Columbus, Ohio, September 4, 5 and 6. Details on the meetings are carried elsewhere in this issue. You will want to make plans—if you have not done so—to attend this important conference on "What's Ahead for Soybeans?"

And you'll want to study the September issue carefully—it will contain the ideas of leaders of the industry on the fields in which soybeans will find their increasing markets during coming years. It will probably be the largest issue of the *Soybean Digest* ever printed.

BOLTED STEEL GRAIN TANKS



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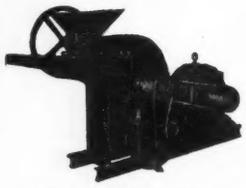

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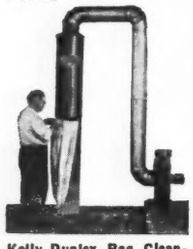

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GROWERS

Big Bean Acreage

Over 12,500 acres of soybeans are being grown this year on one Arkansas plantation!

This vast acreage of soys is boasted by the Lee Wilson & Co. plantation at Wilson, Ark. The Wilson plantation's operations were described recently in a feature article in the *Arkansas Democrat*, Little Rock, by Editor C. C. Allard. Allard called the 52,000-acre plantation the world's largest farm.

Soybeans are being grown on almost one-fourth of the cultivatable acreage of the Wilson farm. Other crops are cotton, on 25,000 acres this year, alfalfa on 12,500 acres, and a comparatively small acreage of corn.

The plantation has gone on this three-crop basis after experimenting in a small way with the idea of converting the plantation into a truck farm. Manager James H. Crain decided against this because of the high labor requirement. The farm, originally run mostly by mule-power has now gone far toward complete mechanization. Recently a mule sale was held which cut the plantation's mule population down to 400. These will be disposed of just as fast as Manager Crain can get tractors to replace them. There are 350 tractors operating on the plantation today, including 100 bought this spring.

Crain is sold on his three-crop rotation as a means of maintaining the high productivity of his delta land. "Alfalfa and soybeans enrich the land worn out by cotton," he states, as reported by *Cotton Gin and Oil Mill Press*. "In 50 years this land will be more productive than it is now. Other soil does not build up under crop rotation because of excessive drainage. This land, on the other hand, drops less than a foot to the mile, and we don't have to bother about terracing."

But tractors will not eliminate manpower on the Wilson plantation. It is responsible for the livelihood of 11,000 people. Two thousand of them live in the town of Wilson, Ark., which is owned by the plantation.

Manager Crain's policy is to process everything raised on the farm and "keep the profits in Arkansas." Five cotton gins process the 25,000 to 30,000-bale cotton crop. The cottonseed and soybeans are processed by the two mills at Wilson, the Delta Products Co., and the Wilson Soybean Mill, both owned by the Wilson interests. The Delta plant recently converted to the solvent extraction process and the Wilson mill is converting to solvent extraction.

The Wilson Co. is also installing refining equipment. Beginning this fall both cottonseed and soybean oil will be refined on the plantation. Last year the plantation sold over 2 million dollars worth of oil for margarine manufacture.

The plantation also has six alfalfa dehydrators with a daily capacity of 2,500 tons of alfalfa meal.

The Wilson Co. conducts all the activities in the town of Wilson. These in-

A few of the 350 tractors operating on the Lee Wilson & Co. plantation.
—Photos Courtesy Arkansas Democrat

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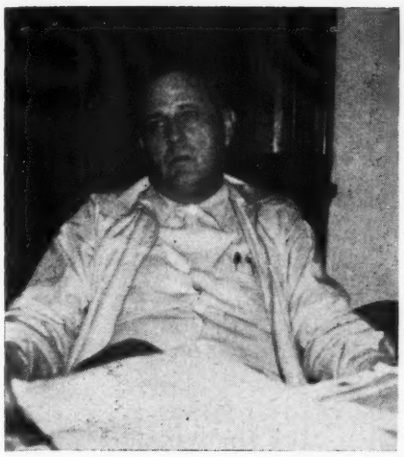


Manager "Jim" Crain, said to operate the largest farm in the world from his desk and a Lincoln sedan.

clude a bank, filling station and auto agency, store, cafe and a medical clinic.

Manager Crain predicts that butter is on its way out as a commercial product, Editor Allard reports in the *Arkansas Democrat.*

"Oleo is cleaner, never touched by human hands, costs less to produce, will always be less per pound, has the same if not higher food value, and the ingredients will be available regardless of feed and meat prices," says Crain. "The day is coming when butter may be used on a farm where it is churned, and sold locally, but it will not be the important national market factor it has been. The price of feed and production will eliminate it as the market control. In fact it has lost so much ground in the last 2 years that oleo today is the price and supply factor."

Leading Iowa Counties

Twenty-seven Iowa counties are among the 100 leading soybean-growing counties in the United States, according to figures from the 1945 Census of Agriculture issued by Director J. C. Capt, Bureau of the Census, Department of Commerce.

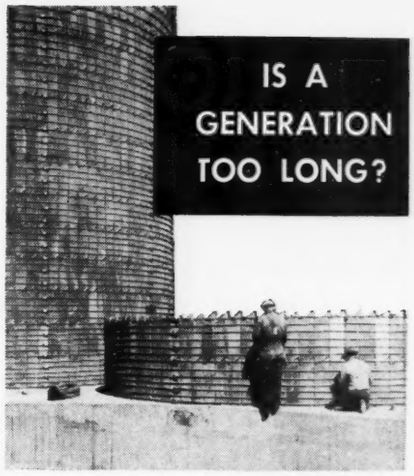
These 27 Iowa counties reported 21,326,237 bushels of soybeans harvested for beans in 1944. This was 55 percent of Iowa's 38,593,034 bushels of soybeans harvested for beans and 11 percent of the nation's 187,725,831 bushels of soybeans harvested for beans.

The 27 leading Iowa soybean counties and their 1944 production of soybeans harvested for beans are:

COUNTY	NATIONAL RANKING	1944 SOYBEAN PRODUCTION (BUSHELS)
Kossuth	27	1,205,028
Webster	29	1,137,655
Calhoun	30	1,109,207
Grundy	32	1,068,650
Pocahontas	41	898,179
Hamilton	44	854,534
Wright	46	828,770
Cerro Gordo	49	811,348
Boone	50	801,413
Greene	51	797,504
Story	55	765,768
Buena Vista	57	753,929
Hardin	59	748,868
Clay	60	748,558
Floyd	61	748,088
Black Hawk	62	741,142
Marshall	64	734,484
Butler	71	701,865
Benton	72	701,463
Dallas	73	696,629
Tama	74	689,379
Hancock	78	673,072
Polk	86	644,376
Des Moines	88	624,731
Henry	89	624,301
Franklin	90	620,196
Palo Alto	93	597,100

More Money from Soys

More profit per acre from soybeans than from cotton has been the experience of I. J. Smith of Greenway in Clay County, Ark., reports *Mid-South Cotton News.* Mr. Smith's tabulations show that the cost per acre for producing cotton last year was $51.50 and with average of 1200 pounds seed cotton or 400 pounds lint cotton per acre, he made $70.50 per acre profit. In case of soybeans, Mr. Smith says his cost per acre was $9 with a yield per acre of 30 bushels selling for average of $3 per bushel. He made a profit of $81 per acre.



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The stave is formed under 140 tons' pressure, at least 5000 lbs. to the square inch—making it dense, smooth, and strong.

Neff & Fry bins are erected by trained crews sent anywhere. Each job is specially engineered. Diameters and heights available as required. Ask for catalog containing full information and photos of installations.

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A Message From Your President

Meet us at Columbus, September 4th!

Twenty-seven years ago the American Soybean Association held its first annual meeting. We hope to have the biggest and best annual meeting to date at Columbus, Ohio, September 4th, 5th and 6th, 1947.

During the past 27 years the soybean crop has emerged and gained a prominent place beside corn in the cash grain areas of this country. During the same period the processing of beans has developed into a big industry. Soybeans helped win the war. We hope that their continued development will be a vital factor in our peace-time economy.

Both the growers and the processors will be represented on the program at Columbus, and we expect everyone to enjoy the splendid program which has been arranged.

Meet us at Columbus, September 4th!

WALTER W. McLAUGHLIN, President,
American Soybean Association, Decatur, Ill.

FOR YOUR RESERVATION AT ASA CONVENTION

We are still looking for your room reservation at the Deshler-Wallick Hotel for the American Soybean Association convention in Columbus September 4-5-6, that is, if it is not already in. Use the form below. Simply clip, fill out and mail to Convention Department, Deshler-Wallick Hotel, Columbus, Ohio. DO IT TODAY!

RESERVE	Check Here	Rate $
Single Room (One Person)		
Double Bed (Two Persons)		"
Twin Beds		"
Parlor and Bedroom		"

A Suggestion

May we suggest to all Convention Delegates the desirability of early reservations and the selection of some one to join you in the occupancy of a double or a twin bedded room. This gives you the advantage of the largest and most beautiful rooms in the hotel at extremely attractive rates per person per day.

RATES All Rooms with combination Tub and Shower Bath.

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$3.30, $3.85, $4.40, $4.95, $5.50, $6.60, $7.70, $8.80

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$5.50, $6.05, $6.60, $7.70, $8.80, $9.90, $11.00, $13.20

TWIN BEDS FOR TWO
$5.50, $6.60, $7.70, $8.80, $9.90, $11.00, $13.20

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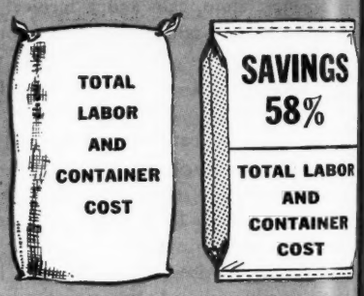
Convention of American Soybean Association

CASE HISTORY No. 17
One in a series of factual experiences of a group of American manufacturers with Multiwall Paper Bags.

COST COMPARISON
(Per Ton)



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How a better container cut packaging costs 58%

"Customers said that lint from the fabric bag contaminated the product...

"That there was a possibility of contamination in transit and in their own storage...

"That moisture-vapor caused the product to 'cake' and become lumpy."

The Michigan Sugar Company, Saginaw, Michigan, reported that these were the objections voiced by its customers to the use of 100-lb. fabric bags for the packaging of both powdered and granulated sugar... products which had to be kept clean and sanitary under all conditions.

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- ★ Approval by *customers,* who reported that Multiwalls delivered *clean* sugar and protected the product from contamination by rodent excreta, dust, dirt, bacteria, and other foreign matter in transit and in their warehouses.
- ★ Maximum protection against "caking" of sugar, even when the bags were exposed to very humid conditions.

Estimate the dollars-and-cents meaning to *your* packaging operation of a better container *plus* a 58% saving.

Today, most of America's commercially packaged sugar is shipped in 100-lb. Multiwalls. Manufacturers of chemicals, foods, feeds, rock products, and fertilizers are also finding that the principles of efficient packaging in low-cost, protective multiwall paper bags are applicable to both large and small packaging operations.

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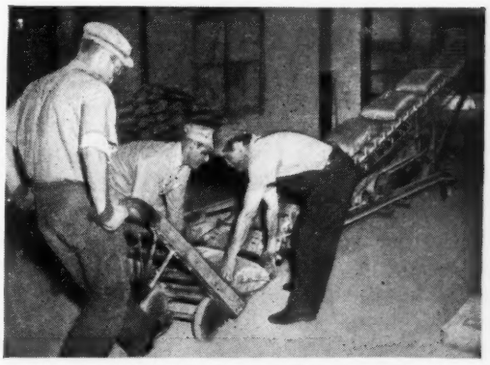

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Without obligation, please send me full details regarding "Case History" No. 17, outlined above.

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COMPANY_____

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Lineup at left with all the soybeans going to market at once, is what we want to avoid. This was a scene at the A. E. Staley Mfg. Co. plant at Decatur, Ill., last fall.

Want an Orderly Market? Store MORE Soybeans

Are you planning to store more soybeans on the farm this year than in the past?

If so, the probabilities are that you will be paid off in higher prices. And you will help to maintain a more dependable soybean market.

Nobody wants to repeat the dizzy dance of prices of last fall and winter. A steadier market will benefit everybody. Dr. G. L. Jordan, agricultural economics professor at the University of Illinois, says the way to cut down on market fluctuations is through:

1. A soybean futures market, and
2. More farm storage of soybeans.

The Chicago Board of Trade resumed trading in soybean futures July 7, after a lapse during the war years. Now the next step is clearly up to soybean growers. They must provide the storage.

Farmers have not been storing soybeans, but have been hauling them direct to the elevator. There have been various reasons, some of them stemming from the war.

A glance at the red graph on this page will tell you what has been happening in the soybean markets. The graph shows the movement of soybeans to primary markets in the United States in 1946. Less than 1 million bushels per month on the average moved to these markets the first 9 months of last year.

But the last 3 months — the months during and following combining — 11 million bushels moved into primary markets, most of them in October and November. Well over half the U. S. soybean crop marketed at primary markets was dumped in less than 2 months last fall! Beans going direct to processors showed the same trend.

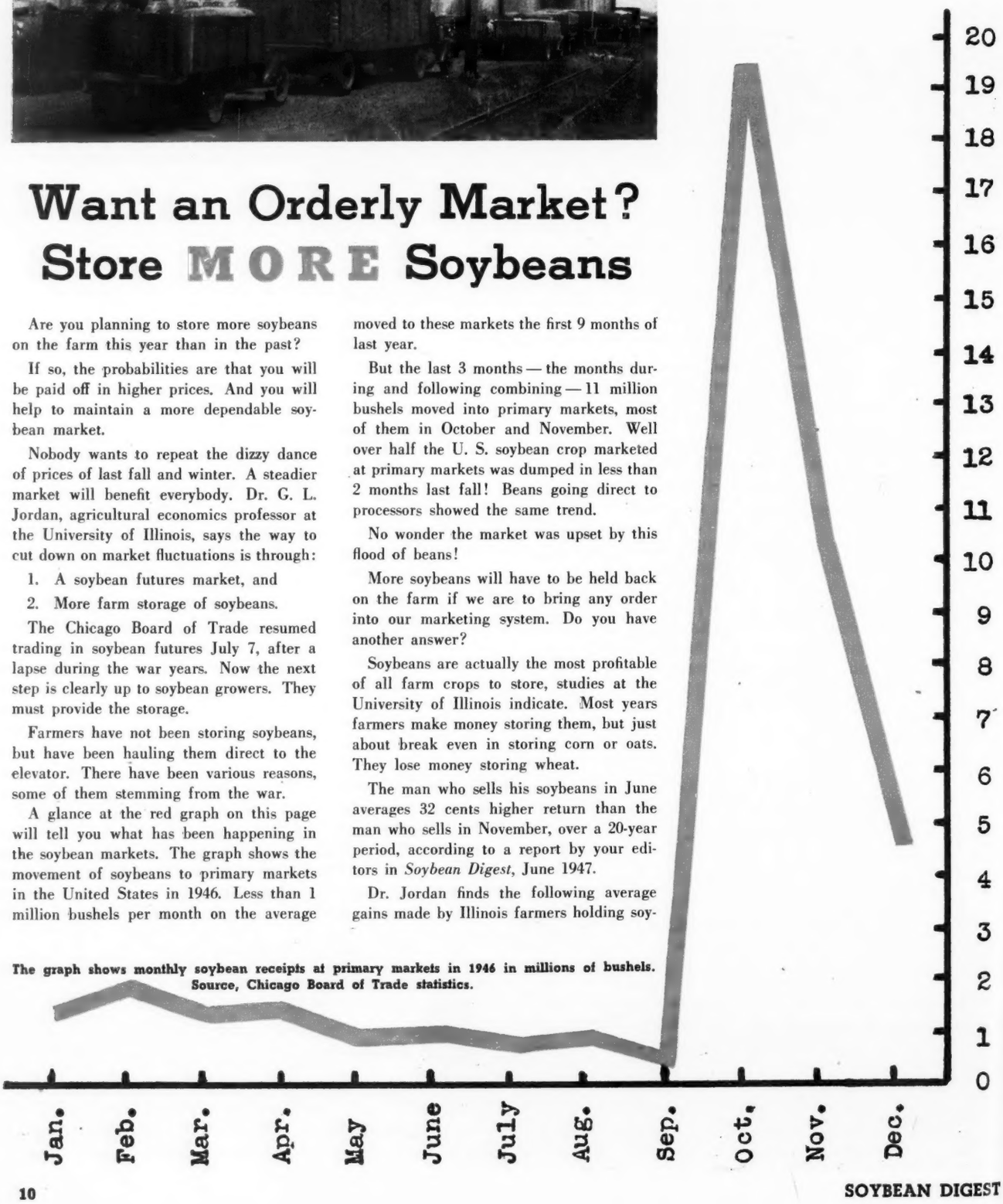
No wonder the market was upset by this flood of beans!

More soybeans will have to be held back on the farm if we are to bring any order into our marketing system. Do you have another answer?

Soybeans are actually the most profitable of all farm crops to store, studies at the University of Illinois indicate. Most years farmers make money storing them, but just about break even in storing corn or oats. They lose money storing wheat.

The man who sells his soybeans in June averages 32 cents higher return than the man who sells in November, over a 20-year period, according to a report by your editors in *Soybean Digest*, June 1947.

Dr. Jordan finds the following average gains made by Illinois farmers holding soy-



The graph shows monthly soybean receipts at primary markets in 1946 in millions of bushels. Source, Chicago Board of Trade statistics.

beans (1925 to 1941) over those who sold in October: sold in December, 6c; January, 16c; February, 18c; March, 24c; April, 26c; May, 34c; June, 36c; July 34c; August, 14c; and September, 5c.

Dr. Jordan believes it will pay well to store soybeans until May, on the average. Most years, the increase in price would have paid for a bin for storing the soybeans in Illinois. That may not be true this year due to the high price of labor and materials. Agricultural engineers estimate it may cost 35 cents per bushel to build good soybean storage this year.

But the soybean crop has come to stay. Providing permanent storage for at least part of your crop will pay off eventually.

Of course it may not be necessary to build new storage in order to hold your crop. Perhaps you can arrange for storage with the local elevator, or rent steel bins from the Commodity Credit Corporation.

The oat crop is short in some localities. Oat bins may be converted to soybean storage by allowing for the fact that soybeans are heavier than oats. Fill an oat bin with soybeans and it may break wide open. But it should hold half as many bushels of soybeans as of oats — and the same tonnage.

OAT BINS NEED REINFORCEMENT

If an oat bin is to be filled with soybeans the number of supports under the floor should be doubled. For a deep bin, be sure the walls are well cross-braced. Check the bottom of all studdings and replace weak or rotten ones, else the bin may bulge at the bottom.

For new storage, any standard building material such as wood, steel or aluminum, or concrete, may be used.

To estimate the capacity of your structure, multiply length by width by height in feet, then divide by 1.25. One bushel of soybeans requires 1.25 cubic feet of storage space. A bin 10 x 12 x 10 feet will accommodate 1,000 bushels.

Soybeans are not hard to store if the building is strong and tight, and if they are kept dry. Most storage troubles are due to too much moisture.

Soybeans must be stored with low moisture content to be successful. For storage during late fall and winter months, a moisture content of from 12 to 14 percent will be low enough, say Leo E. Holman, USDA agricultural engineer, and Deane G. Carter, professor of farm structures of the University of Illinois, whose extensive experiments with farm storage have been previously reported on these pages.

KEEP MOISTURE CONTENT DOWN

For year-around storage, moisture should not be over 12 percent. And soybeans will keep indefinitely at 9 percent — they deteriorated very little in 3 years at the University of Illinois.

Insects bother soybeans very little if moisture is 12 percent or less.

During combining it will be well to test samples of soybeans at your local elevator to make sure they are dry enough to store. Of 325 truckloads of soybeans tested at a local elevator in Illinois in 1944, 85 percent had over 12 percent moisture and were unsafe for warm-weather storage.

Be sure to test walls and roofs for leaks. Moisture entering at joints, boltheads, cracks or other openings is bound to cause damage or loss. Soybeans will pick up moisture very rapidly in a damp bin even if they are dry when stored.

Steel bins require a good dry bottom. One of the best foundations is a fill of 15 to 18 cubic yards of gravel under the metal floor. A ring of concrete blocks kept in line with wire bands and the center filled with packed earth is also used.

But what can be done if the soybeans must be stored wet? Ventilation by natural draft is not effective in drying out soybeans in the bin, Carter and Holman say. Nor have they found downdraft roof ventilators of much value.

But they have been successful with forced air systems. "Forced air, using electric fans, was quite effective," they say. "Moisture can be reduced if the fan is operated under good dry conditions. Forced, heated air is the most effective means of conditioning. Various experiments in the past year show the practicability of reducing 17 to 20 percent moisture down to 14 to 12 percent or even lower. Fuel cost was about ½-cent per bushel for each percent moisture reduction."

If you plan to store substantial quantities of soybeans, you will watch this artificial drying program of Carter and Holman closely.

Incidentally, the University of Illinois, College of Agriculture, Urbana, is a good source of building plans for all types of farm structures, including bins and granaries. The blueprints are sold on a cost-of-printing basis.

—s b d—

INCREASING USE OF SOY FLOUR IN CANDY

Soy albumen is superior to egg albumen for making certain types of candies, according to Charles Carilli, technical editor of *Candy Industry*. This is particularly true of the mazetta, which is incorporated in cream centers.

Soy flour will replace portions of milk and fat in caramel batches. This not only results in a saving, but also produces a very palatable caramel with good eating and keeping qualities, Carilli says.

In pan work, soy flour is successfully used in the gumming process, replacing ordinary wheat flour.

Carilli also finds that the whole roasted soybean has a decided advantage over roasted peanuts in that it possesses a better shelf life, crispness, taste appeal and resistance to infestation.

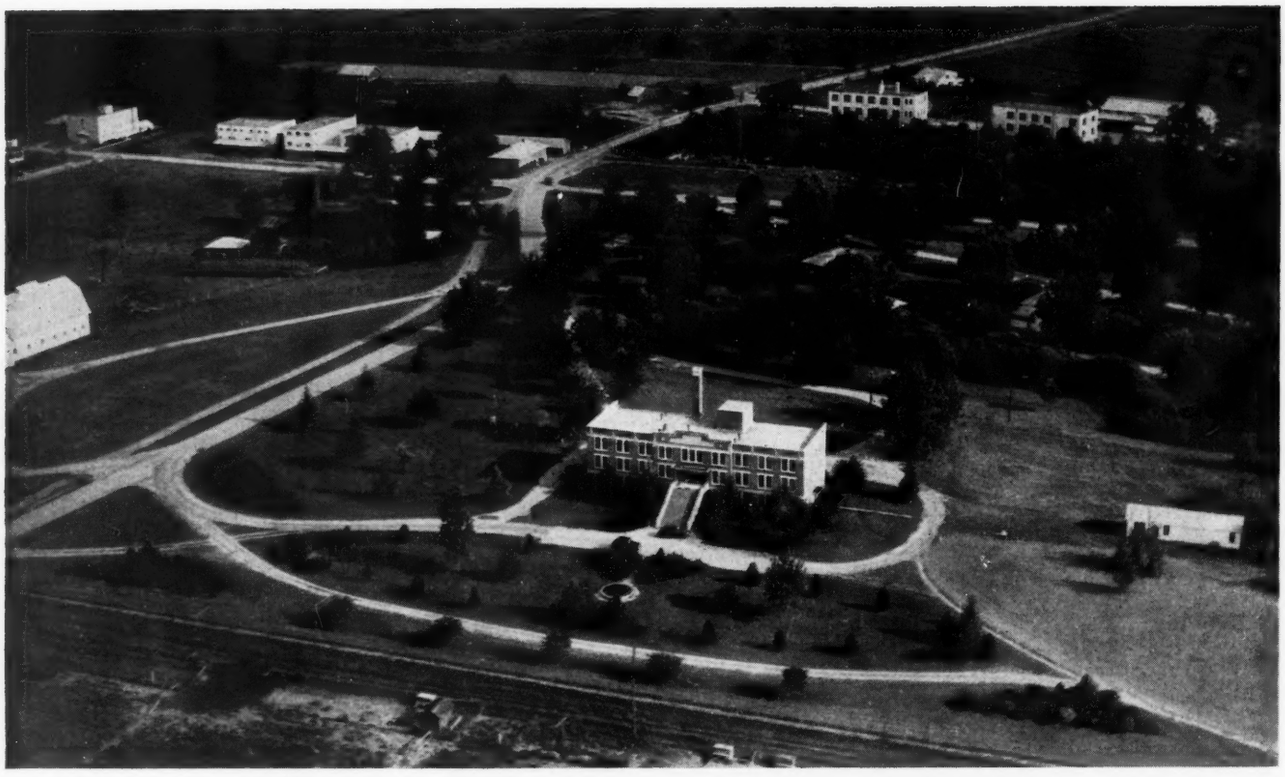
—s b d—

FRENCH HONOR

The Association of Chemists and Engineers of the Sugar, Alcohol and Agricultural Industries of Paris, recently bestowed on Am. Matagrin, Chindrieux, Savoy, France, the Dautel silver medal for his contributions to the soybean.

Matagrin is the author of *Le Soya et les Industries du Soya*, and other books, as well as numerous articles on soybeans in French publications.

They are learning about soybean storage at the University of Illinois where an extensive research project has been under way since 1943.



—Photo courtesy Delta Experiment Station

The Delta Experiment Station at Stoneville, Miss., where the breeding work of the Southeastern states is centered

RESEARCH ON SOYBEANS

By J. L. CARTTER

A Talk given at the Soybean Conference, Northern Regional Research Laboratory, Peoria, Ill., February 28
U. S .Regional Soybean Laboratory

WE PLAN to tell you this morning about the organization of the U. S. Regional Soybean Laboratory and some of the accomplishments. We will also discuss the soybean disease investigations of the Division of Forage Crops and Diseases and mention some of the accomplishments of that work.

The U. S. Regional Soybean Laboratory was organized in 1936, being the third of a series of laboratories initiated under the Bankhead-Jones Act. The Soybean Laboratory as originally set up was a cooperation between the Bureau of Plant Industry, Soils, and Agricultural Engineering; the Bureau of Agricultural and Industrial Chemistry; and the 12 states of the North Central region.

In 1942 the work on industrial utilization of the soybean was transferred to the Northern Regional Research Laboratory. At that same time, there was an urgent need developing for additional vegetable oils and high-protein feeds to meet the demands of the war period. At the request of the experiment station directors of the Southeastern states and with the permission of the directors of the North Central states, the work of the Laboratory was expanded to include the two regions. The purpose of the Laboratory as set forth in a cooperative agreement approved by the North Central directors in October 1942 reads as follows:

"The object of the research to be done under this memorandum is to develop, through breeding, adapted superior strains or varieties of soybeans for industrial purposes and to obtain facts relating to the effect of variety, soil, climate, fertilizers, minor elements, and disease on the growth methods of production, and composition of soybean seed for industrial uses."

Work during the first few years was devoted to fundamental studies on the methods of breeding soybeans and on exploring the factors affecting accuracy of nursery trials. Along with this work we also began the collection of soybean introductions and selections to serve as a foundation stock of germ plasm for the breeding work. Along with these fundamental studies and the collection of foundation material, an extensive program of breeding was initiated.

The development of improved varieties of soybeans, in early years, came through selections from introductions obtained from the Orient. This first work, which occupied the period up to the last few years, resulted in the development of such varieties as Dunfield, Illini, Manchu, Richland, and many of the other varieties with which we have been familiar in the past and which have played an important part in the establishment of soybeans as a major crop.

New, improved soybean varieties are now produced largely by hybridization. Most of the crosses that are being developed through the cooperative program are made at four or five breeding centers and the better of the segregating plant populations are distributed in an early stage to all the interested experiment stations so that further selection can be done in the area for which the strains are being developed.

In connection with the evaluation of new

• *A comprehensive soybean breeding and disease control program, tailormade to fit the changing needs of the times, has been developed by the U. S. Regional Soybean Laboratory. Mr. Cartter has been agronomist in charge of the Laboratory at Urbana since 1942.*

strains, the establishment of an analytical section in the Laboratory has permitted the use of chemical analysis as a tool in the breeding work. In the past it has been customary to make selection only for yield, lodging resistance, seed quality, maturity, and such other agronomic factors that could be observed. The use of chemical analysis has increased tremendously the opportunities for developing varieties that are superior for industrial use, as well as superior in yield.

After strains produced through the breeding work have become sufficiently fixed as to type, the better of them are placed in preliminary nurseries. The best of these are entered in what we have designated as the "Uniform Soybean Tests" which have been set up to give a critical evaluation of the top strains that are being developed through the breeding program. The varieties and strains we are studying in the Uniform Soybean Tests are divided into maturity groups, and starting with the very earliest, adapted to North Dakota and Minnesota, we have designated these as the Uniform Test, Groups 0, I, II, III, etc., extending down to Group VIII which is composed of very late strains adapted to the southern part of the Gulf Coast Region of the United States. During the past season nurseries were planted at 44 locations in the North Central states and at 52 locations in the South.

ACCOMPLISHMENTS OF THE BREEDING PROGRAM

In regard to accomplishments we will mention first some of the progress in the Southeastern states. In 1943 and for the next 2 years, the Uniform Tests which we established in cooperation with the state experiment stations of the region were composed mostly of the named varieties that were available and were being recommended by the state stations. These studies indicated that Ogden, which was then grown to a limited extent, was outstanding in the upper half of the Southern region, being the highest in yield and oil content of the strains under test, and being very lodging resistant. It is now the principal variety in this area. Ogden, however, is rather short especially on poor soils, and has a tendency to shatter. It is now being used extensively in crosses to carry its desirable qualities into new strains that are taller and hold their seed better.

Roanoke, a selection from a mixed seed lot, has been developed at the North Carolina Experiment Station by Jack Rigney of the agronomy department and Edgar Hartwig of the Laboratory. Roanoke is some 10 days later than Ogden, being of about the same maturity as Volstate. It has been outstanding in the central South, slightly outyielding Volstate, and having an oil content about 0.7 percent higher.

A selection out of a cross Haberlandt x Ogden is showing much promise in recent yield tests. This strain has the yield of Ogden combined with the taller and better seed-holding habit of the Haberlandt variety. In general it is adapted to less fertile soils than Ogden and embodies the high oil content characteristic of the Haberlandt. Many of these new strains will rapidly replace the older varieties, as their value is realized and seed stocks become available.

Up to this year there have been no particularly outstanding strains of the maturity of Group V, that is, for material to be grown through Tennessee, northern Arkansas, and Oklahoma. We are starting in 1947 a Group V nursery which will contain strains from crosses between Dunfield x Arksoy, Haberlandt x Dunfield, and a number of other crosses between the better northern and southern strains. We feel confident that through this breeding program strains will be developed that will be superior and well adapted to this area.

SOUTHEASTERN VARIETIES

In the southeastern part of the United States some difficulty has been encountered in obtaining strains with good seed quality. It has been found that varieties coming from the Nanking region of China are able to develop good seed under these conditions. Many of these types, such as Monetta, Nanking, Palmetto, and Missoy, have been crossed with such high-yielding, high-oil-content strains as Odgen and Volstate, and selections from these crosses have been obtained that give indication of being superior to any of the strains now available for the southeastern Coastal Plains region. One of these new strains from a cross Ogden x Missoy entered in Uniform Test, Group VII, in 1946 led these strains in yield in the Southeast this first year.

Turning to the North Central States, the first few years of the Laboratory work, so far as the development of varieties and strains was concerned, was devoted mainly to the agronomic and chemical evaluation of the varieties that were available. Among the strains released on the basis of the evaluation were Patoka, Gibson, and Earlyana developed by the Indiana Experiment Station; Chief, developed by the Illinois Station; and Boone, developed by the Missouri Station. By growing strains in the Uniform Nurseries at many locations in a region, it has been possible to evaluate them in a relatively short period of time. This is due to the fact that within a single year the seasonal conditions will vary considerably from place to place giving the equivalent of several crop years of information within a single season.

J. L. CARTTER

A Canadian variety, Capital, developed at Ottawa, Ontario, has been tested widely from Oregon to New York for the first time in the Uniform Tests in 1946, and has proved to be high in yield and high in oil content. This strain being earlier, taller, higher in yield and in oil content than Mandarin (Ottawa) should be valuable in the northern tier of states.

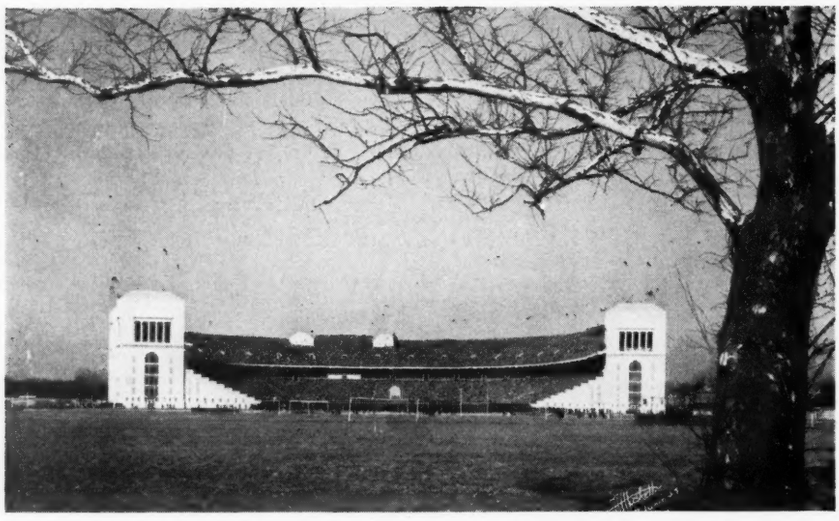
Another promising strain for the Northern states, a selection from Mukden x Richland developed in cooperation with the Iowa station is somewhat earlier than Earlyana, stands up much better, yields more and has a higher oil content. It should be very useful in southern Minnesota, Wisconsin, Michigan and northern Indiana.

Another selection from the same cross has been yielding only slightly under Lincoln, has averaged from 4 to 7 days earlier, and has ranked better in lodging resistance and equal in oil content. This strain will probably be released this year and should replace Richland in its area of adaptation as well as some of the Lincoln acreage where earlier maturity is desired.

Lincoln is probably the most outstanding variety developed to date. This strain, originating from a natural cross between Mandarin and Manchu, was developed cooperatively by the Illinois Station and the Laboratory and was released for increase simultaneously by several of the stations in the Cornbelt. Lincoln has proved outstanding in yield and oil content in its area of adaptation and is rapidly replacing such varieties as Illini, Dunfield, Mukden, Manchu, and others of similar maturity. The variety Lincoln at present is grown on over half of the soybean acreage in Illinois and Indiana and is partly responsible for the high yield per acre obtained last season.

DRAWBACK OF LINCOLN

This variety, while being outstanding in yield and oil content, does not have all the lodging resistance that producers would like, nor is it early enough for growing in the northern parts of Indiana, Illinois, and Iowa. A backcross, Lincoln x (Lincoln x Richland), has been made for the purpose of combining the high yield and high oil content of Lincoln with the lodging resistance and earliness of Richland. The earliest segregates from this backcross have been sent to Minnesota, the slightly later



Ohio State University stadium, scene of many a tough gridiron struggle. One of the features to be seen by ASA convention visitors in September.

material sent to Wisconsin, Iowa, Indiana, and Ohio, and the late material from the cross held at Urbana and points of similar latitude. Transgressive segregation for earliness has been obtained and some of the progeny from this backcross show promise of being early and lodging desistant, as well as having high yield and high oil content.

A selection from a cross Dunfield x Illini, developed cooperatively with Iowa, has averaged higher in oil content than either of the parents, being outstanding at many of the nursery locations, occasionally exceeding Lincoln in yield and oil content. This strain has good lodging resistance, but its yield performance has been somewhat erratic. It is of entirely different parentage than Lincoln and for this reason the pathologists are recommending on the basis of their experience with other crops that the variety be released for increase in areas where its performance has been as good as that of Lincoln. The basis for this recommendation is that in case of a serious outbreak from some new and quite virulent disease, one variety of a crop might chance to be resistant to the particular disease while another variety embodying different germ plasm might be susceptible.

SOME NEW STRAINS

A number of improved strains of Group IV maturity have been developed in cooperation with the Indiana Station. One of them from a cross between Dunfield and Mansoy is being considered for release. This strain has a high yield and high oil content and is well adapted in the Group IV area. This strain is taller than Patoka and equal in lodging resistance. It has better yield and higher oil content than Chief, Patoka and Gibson, and may well replace these varieties.

Thus as we look at the new varieties that have been developed through the cooperative efforts of the state experiment stations and the Laboratory, we see that in general these varieties have a wide area of adaptation, illustrating the value of a coordinated regional approach in this work.

ORGANIZATION OF DISEASE WORK

We would like to tell you about the organization of the soybean disease project in the Division of Forage Crops and Diseases and of some of the accomplishments of this work.

For several years after soybeans were introduced into this country we frequently heard the expression that the crop was free from diseases. This is the usual experience with a crop that is introduced into a new locality, and it is not until the crop has been grown for a number of years and the acreage becomes concentrated that serious diseases begin to make their appearance. This is the case with soybeans. In 1944 through the efforts of soybean producers and processors funds were made available by Congress to the Bureau of Plant Industry for conducting research on soybean diseases.

At the time the soybean disease work was initiated in the Department of Agriculture, the fundamental knowledge in this field was remarkably low. We are, therefore, still very much concerned in our disease work with the fundamental nature of the diseases.

The research work under the new soybean disease project in the Division is being devoted to the study of the life histories and control of diseases and the development of methods of testing soybean strains for resistance. The work is closely integrated with the work of the Soybean Laboratory and the state experiment stations. The leader of this new project is located at Urbana with a coordinator for the southern work located at the southern headquarters for the Laboratory project at Stoneville, Miss. In this way close coordination can be maintained. Cooperative disease work is being conducted in 11 states at the present time.

There are 25 or 30 diseases that affect the soybean, some of them being more serious than others. The work on two of these diseases, bacterial pustule and downy mildew, exemplify the manner in which we are integrating this work with that of the breeding project. It has been found that a southern variety, C.N.S., while not being a superior one agronomically does carry resistance to bacterial pustule. Crosses have been made between C. N. S. and superior varieties from other areas in order to introduce this factor of resistance into these new strains. Progeny from several of these crosses have shown sharp segregation for pustule resistance, giving us definite promise that this phase of the program will be successful.

With downy mildew we have also found that breeding for resistance is possible and several crosses have been made for the purpose of developing improved mildew resistant strains.

Two other diseases, bud blight and brown stem rot, are relatively new and give evidence of being among our most severe ones in this area. Bud blight caused by the tobacco ring spot virus has been quite destructive in rather localized areas and if given ideal conditions might prove serious. This disease is manifest in several ways, depending upon the stage of growth of the soybean plant at time of infection. The disease is not carried in the seed so far as we have been able to determine by extensive investigations. So far no insect vector or overwintering plant has been found to carry the virus from season to season. The present work on this disease, therefore, embodies a search for possible insect vectors, alternate hosts and resistant varieties.

BROWN STEM ROT THREATENS

Brown stem rot is possibly the most threatening of any of the diseases that are now known to attack the soybean. It is caused by a fungus recently identified as of the genus *Cephalosporium*, being a new species published on recently by Presley and Allington. The fungus exists in the soil and attacks the soybean plants, possibly through the roots. The first leaf symptoms usually appear in the fall as the plants approach maturity, generally appearing as a withering of the leaf tissue between the veins. These leaf symptoms often occur quite suddenly and may be mistaken for a light frost. Stem symptoms consist of a browning of the pith, usually starting from the base of the plant and working upwards. It may be distinguished from bud blight by the fact that bud blight also causes a browning of the pith but this browning generally starts at the upper nodes of the plant and works downward.

In several locations this past season Dr. Allington and his co-workers have observed areas of severe infection of brown stem rot sharply delineated from healthy areas in the field by straight lines. In all of these in-

(Continued on page 17)

"What's Ahead for SOYBEANS?"

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New Names on 1947 Program

New speakers of outstanding interest will appear on the program of the American Soybean Association convention at Columbus Sept. 4-6. And there will be some familiar faces—old friends who have been connected with the soybean industry for many years.

O. K. QUIVEY, manager of agricultural development for the Baltimore & Ohio Railroad, is eminently fitted to be our keynoter. Well known to soybean people, he has been actively promoting soybean growing in B & O states for many years.

DR. B. F. DAUBERT is supervisor of all research projects in fats and oils at the University of Pittsburgh. He has conducted recent research on stability of food products, including soy. He will discuss the future of soybean oil in foods.

DR. RALPH H. MANLEY, director of scientific research for General Mills, Inc., will fill in industry's part of the picture for soybean oil. Formerly with the Northern Regional Research Laboratory, he directed the development of "Norepol," a synthetic rubber from soybean oil, and helped pioneer the extraction and industrial application of zein from corn gluten. At the General Mills laboratories he is developing new industrial uses for vegetable oils and proteins.

WHEELER McMILLEN, editor-in-chief of *Farm Journal* and editorial director of *Pathfinder*, of course needs no introduction to any agricultural audience. He is also

O. K. QUIVEY

27th Annual Convention of the AMERICAN SOYBEAN ASSOCIATION

Deshler-Wallick Hotel, Columbus, Ohio, Sept. 4-6

PROGRAM

WEDNESDAY, SEPTEMBER 3

3:00 P.M. Board of Directors Meeting, Deshler-Wallick Hotel.

6:00 P.M.—10:00 P.M. Advance Registration, Mezzanine Floor.

8:00 P.M. Informal Smoker.

THURSDAY, SEPTEMBER 4

8:00 A.M. Registration, Mezzanine Floor. Exhibit Booths Open.

9:00 A.M. Trip to Ohio State University Farms, in Charge of Dr. Lewis Saboe. Busses Leave at Intervals Until 10:00 A.M. Transportation Furnished by Ohio Soybean Processors Association. Visit to Madison Farm.

12:00 M. Luncheon Ohio State University Cafeteria.

1:30 P.M. Visits to OSU Agronomy Farm, Sinclair Farm. Soybean Production Machinery Exhibits.

FRIDAY, SEPTEMBER 5

9:00 A.M. Exhibits Open, Mezzanine Floor. Registration at Desk.

9:30 A.M. Ball Room, Deshler-Wallick Hotel, Walter W. McLaughlin, President American Soybean Association, Presiding.
"Greetings from the State of Ohio," Frank Farnsworth, Director of Agriculture, State of Ohio, Columbus.
"Greetings from Columbus," Mayor James A. Rhodes.
Group Singing, Led by Joe Siebold, McMillen Feed Mills, Fort Wayne, Ind.
"What's Ahead for Soybeans?" O. K. Quivey, Manager Agricultural Development, Baltimore & Ohio Railroad, Baltimore, Md.
"What's Ahead for Soybean Oil in Industry?" Dr. Ralph H. Manley, Director of Scientific Research, General Mills, Inc., Minneapolis.

1:30 P.M. Reconvene. J. B. Edmondson, vice president American Soybean Association, presiding.
"The Present Status of Soybean Diseases," Dr. J. L. Allison, Senior Pathologist, Bureau of Plant Industry, Beltsville, Md.
"Research and Chemurgy," V. H. Peterson, Public Relations Department, E. I. Dupont de Nemours & Co., Wilmington, Del.
Group Singing, Joe Siebold.
"Let's Protect the American Market for American Farms," Wheeler McMillen, Editor-in-Chief Farm Journal, Philadelphia.
"Let's Have Free Trade in Vegetable Oils," Dr. Lawrence Witt, Associate Professor in Agricultural Economics, Michigan State College, East Lansing, Mich.
"Soybean Research at the Northern Regional Research Laboratory," G. E. Hilbert, Director Northern Regional Research Laboratory, Peoria.
"What's Ahead for Soybean Oil in Foods?" Dr. B. F. Daubert, Research Professor, Department of Chemistry, University of Pittsburgh.
"What's Ahead for Soy Protein in Industry," A. K. Smith, Oil and Protein Division Northern Regional Research Laboratory.

7:00 P.M. Banquet, Ball Room, Deshler-Wallick Hotel.
Singing, Joe Siebold.
Entertainment.
Presentation of Honorary Life Memberships.
Introduction of Guests.
"Ohio State Experiment Station and Agricultural Research," L. L. Rummell, Dean of Agriculture, Ohio State University, Columbus.
Speaker of the Evening, to be announced.

SATURDAY, SEPTEMBER 6

9:00 A.M. Exhibits on Display.

9:30 A.M. Annual Business Meeting, American Soybean Association.

10:30 A.M. Howard L. Roach, Director American Soybean Association, Presiding.
"Weed Control in Soybeans," Dr. C. J. Willard, Professor of Agronomy, Ohio State University.
"Soybean Oil in Paints," Fred J. Stark, Sicca Soya Paint Co., Peoria.
"Soybean Research Under the Research and Marketing Act," E. A. Meyer, Administrator Research and Marketing Act, U. S. Department of Agriculture, Washington, D. C.

1:30 P.M. Reconvene. G. G. McIlroy, Director American Soybean Association, presiding.
"What About Export Markets for Soybeans?" Fred Rossiter, Office of Foreign Agricultural Relations, U. S. Department of Agriculture, Washington, D. C.
"Soybean Trends in the Orient," Speaker to be Announced.
"Large-Scale Soybean Production in the Cotton Country," Speaker to be announced.
"Soybean Production and Processing in Canada," F. H. Lehberg, Oils and Fats Administration, Dominion Government, Ottawa, Ontario, Canada.

known to our group as president of the National Farm Chemurgic Council. His subject, tariff protection, is one of vital impact on our industry.

DR. LAWRENCE WITT, associate professor in Agricultural Economics, East Lansing, Mich., will oppose Mr. McMillen in a discussion of our government's foreign trade policy. He favors free trade in vegetable oils.

DR. G. E. HILBERT, as director of the Northern Regional Research Laboratory, Peoria, is becoming well and favorably known to ASA audiences. He will discuss the latest soybean research work done at the Laboratory.

L. L. RUMMELL is new to Ohio State University. He recently resigned as director of public relations for the Kroger Co. to become OSU's dean of agriculture. He will discuss farm research as it applies to the State Experiment Station.

DR. C. J. WILLARD has been acting head of the department of agronomy at Ohio State University for the past year. His subject, weed control, is one of the knotty problems perennially confronting growers.

E. A. MEYER has been in Washington since 1941, heads up the new Research and Marketing Act. He will discuss the soybean research program under this Act.

FRED ROSSITER of USDA's Office of Foreign Agricultural Relations, is known to members as he was on our program last year. He will discuss export markets for soybeans.

FRED J. STARK, Sicca Soya Paint Co., Inc., Peoria, is a well known authority on paints and well qualified to discuss the usage of soybean oil in that product.

JOE SIEBOLD of the sales department, McMillen Feed Mills, Fort Wayne, will lend a convivial touch to the meetings. He is song leader.

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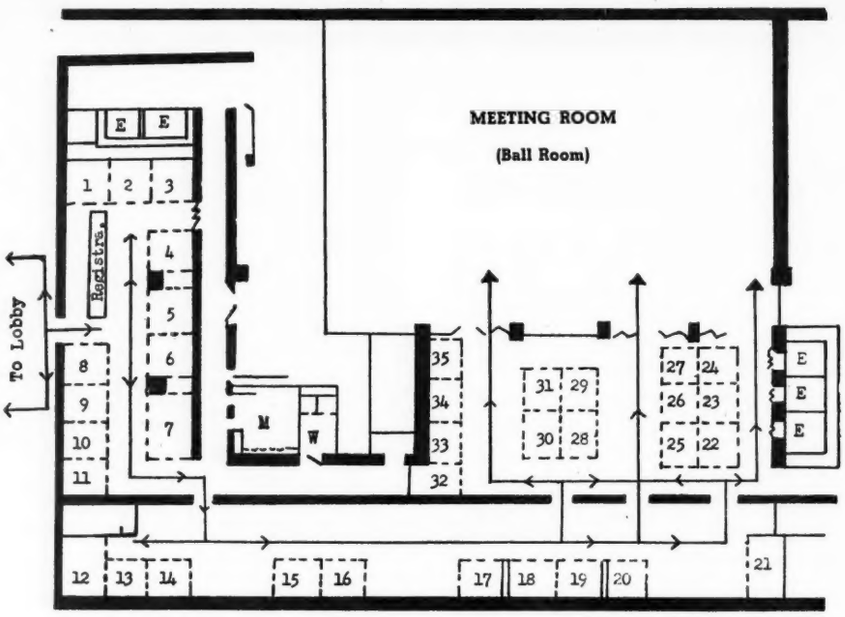
Visit With These Exhibitors



Firms serving the soybean industry will be represented by exhibits of their services and merchandise at the American Soybean Association convention at Deshler-Wallick Hotel, Columbus, Ohio, September 4-5-6.

Exhibit booths will be on the mezzanine floor of the hotel, as will convention sessions. Exhibitors will appreciate an opportunity to meet and visit with you.

Booth No.

4—Urbana Laboratories, Urbana, Ill.
5—Neff & Fry Co., Camden, Ohio.
6—Dixie Machinery Manufacturing Co., St. Louis, Mo.
7—Soybean Digest, Hudson, Iowa.
8, 9—The Wolf Co., Chambersburg, Pa.
10—A. E. Staley Manufacturing Co., Decatur, Ill.
11—Anglo-American Mills Corp., Owensboro, Ky.
14—Signal Scale and Manufacturing Co., Louisville, Ky.
15, 16—Blaw-Knox Co., Pittsburgh, Pa.
17—Safety Car Heating & Lighting Co., New Haven, Conn.
18—Baltimore & Ohio Railroad, Baltimore, Md.
19—Gruendler Crusher & Pulverizer Co., St. Louis, Mo.
20—Hendrick Manufacturing Co., Carbondale, Pa.
21—Nickel Plate Road, Cleveland.
24—Skelly Oil Co., Kansas City, Mo.
25—Exact Weight Scale Co., Columbus, Ohio.
26—Agricultural Laboratories, Inc., Columbus, Ohio.
27—V. D. Anderson Co., Cleveland, Ohio.
28—Butler Manufacturing Co., Kansas City, Mo.
29—National Association of Margarine Manufacturers, Washington, D. C.
30—Wm. H. Banks Warehouses, Inc., Chicago, Ill.
31—American Cyanamid Co., New York, N. Y.
32, 33—Nitragin Co., Inc., Milwaukee, Wis.
34—Seedburo Equipment Co., Chicago, Ill.
35—International Nutrition Laboratory, Mt. Vernon, Ohio.

The following booths were still available to exhibitors at press time: 1, 2, 3, 12, 13, 22 and 23.

WHEELER McMILLEN

E. A. MEYER

G. E. HILBERT

A NORTH CAROLINA PIONEER

By F. H. JETER

Like a voice in the wilderness, C. B. Williams, agronomist for the North Carolina Experiment Station, and one-time director, cried out 30 years ago that the soybean was one of the most valuable plants ever to come to the state. I met Mr. Williams for the first time in the summer of 1914. That next November, I began work at State College as extension editor under the newly established agricultural extension service. One of the first jobs I was called upon to do was to help Mr. Williams sell soybeans to the farmers of the state. He stood almost alone. But he was indomitable in the courage of his convictions.

Not only did he get samples of the beans from the farmers down in Hyde County, or from Camden, his native county; but, he encouraged oil mills to buy the beans for crushing purposes and then he made suggestions to manufacturing concerns about using the beans for varnishes, paints, and other uses. That was pioneer work in those days. It was before the crusading of Henry Ford and others interested in chemurgy.

Many a time, I have seen the learned agronomist crunching a bit of cracker or cookie made from soybean flour; and, though the refining process had not been perfected, he claimed that it was delicious. Perhaps, if he had let his claim remain at "nourishing" and left off the matter of taste, he would have been more successful in having the soy flour adopted as staple item of diet.

But, having charge of the experimental plots and all of the research work in agronomy conducted by the state of North Carolina at that time, Mr. Williams saw to it that all new introductions of soybeans were tested in this state. He conducted variety demonstrations, fertilizer demonstrations, and breeding work. He wrote pages of solid copy for the newspapers and local farm magazines and he used the old Farmers' Institutes and their successor, the extension meeting, to promote the growth of soybeans. In a way he was successful. North Carolina adopted the soybean for a brief period. Some new varieties were originated; studies were made as to shattering; the two-wheeled mechanical soybean harvester was invented; and the place of the bean in the crop rotations of that day was investigated. The first commercial manufacture of soybean oil and oil meal in the United States was started on December 13, 1915, by the Elizabeth City Oil and Fertilizer Co. of Elizabeth City in Pasquotank County, N. C. This came largely at Mr. Williams' insistence. The mill crushed about 20,000 bushels of soybeans at that time; and the manager of the mill said that changing over from crushing cottonseed to crushing the soybeans did not involve an expense greater than $5.

RALPH H. MANLEY
Will speak on oil in industry.

BROUGHT IN BY SEA CAPTAIN

Mr. Williams once told me that the first soybeans coming to North Carolina were brought to Hyde County about 1870 by an old sea captain who secured the beans in the Orient. In those days, men sailed the seven seas from the sand bound coast of eastern North Carolina. Later the beans came to Camden County and to old Edenton and to Elizabeth City and, still later, began to be distributed about over all of the coastal country. The growers called them Japan peas, coffee berries, and other names. They are still known in that section as "peas."

As the soybean began to spread from the coastal lowlands across the state to the mountains, tobacco growers said the land was made too fertile by the legume. Other kinds of troubles seemed to follow the bean when it was planted for a number of years on the farm. The tobacco growers did not know about crowding more plants on the more fertile soil or balancing the increased nitrogen by more phosphate and potash, and so the beans lost favor. The Midwest took them on, but from that time production began to decline in North Carolina.

They are coming back now as Tarheel growers realize that they had just about lost something very valuable. New varieties more suited to actual farming conditions in this section have been originated by such men as Dr. E. E. Hartwig, J. A. Rigney, and their agronomy associates.

But the man who gave the soybean to the South was Prof. Charles Burgess Williams. He was born in Camden County, N. C.; educated at State College where he was graduated in the first class; and served

C. B. WILLIAMS

the state with lasting devotion until his death from a heart attack on June 25, 1947. He was 76 years old at the time of his death. He was the first dean of Agriculture at State College and its first agronomist. During his prime, he probably knew more about the crops and soils of his native state than any other man. He was primarily responsible for the active soil survey work undertaken, and he based his fertilizer and crop variety recommendations upon field experiments conducted on the several soil types. He was not a man who could be rushed into rash statements, but his convictions were deep; and I think that, even now, he is still somewhat disappointed in his fellow North Carolinians who would not see in the soybean the crop that he believed it to be.

—s b d—

CARTTER

(Continued from page 14)

stances a history of the field showed that in the infected portion soybeans had followed soybeans, either directly or with only one or two other crops intervening in the rotation. The healthy area of the field was that portion where soybeans had not followed soybeans directly but where the soybean crops had been separated at least 3 years in the cropping sequence. These observations give us a lead on a possible control, and we are now advocating that in areas where this disease has appeared soybeans should not follow soybeans in the cropping sequence oftener than once in 4 years.

A search is being made among all the introductions and selections that are available in an effort to find types that are resistant to the various soybean diseases that are of economic importance. As these resistant strains are found they will be crossed with the better agronomic types for the purpose of producing improved, disease resistant strains for industrial use.

SAMPLING CRUDE SOYBEAN OIL

On Loading and in Tank Cars at Destination

By EGBERT FREYER

Chairman NSPA Sampling Committee
(Sampling Committee membership:
N. F. Kruse, Lamar Kishlar,
R. T. Milner)

SCHEDULED to go into operation on the new soybean oil crop in October is the revised National Soybean Processors Association's trading rule 102 which represents a milestone in the gradual evolution in our industry of trading practices under which price adjustments are made on the basis of the actual value of a material for the specific use to which it is put. Formal announcement of this change has been or is currently being made to all interested persons, and if a detailed explanation of its provisions has not been circulated by the time this article appears, such information will appear in good time before the change goes into effect.

Meanwhile it has been considered necessary to highlight an extremely important aspect of the new rule, one on which its successful application may well hinge. That is the importance of supplying truly representative tank car samples. Indeed, so important has this angle been considered that a sampling committee has been formed among the technical group of the National Soybean Processors Association, with the primary object at this time of disseminating information on correct sampling procedures and of stressing the importance of adhering to these. This article is a part of that program.

That correct sampling is vital will be apparent from a brief consideration of the rule and how it operates. The price of the crude soybean oil is adjusted on the basis of its refining loss, as determined by laboratory refining tests made under carefully specified conditions. The magnitude of this refining loss determines the value of the crude oil to the buyer, who is a refiner in most cases. Thus, discounts are allowed for refining losses in excess of the basis value of 7.0 percent loss, and premiums collected for refining losses under this basis value. The discount and premium rate, ¾ of 1 percent of the contract price for each 1 percent of refining loss difference referred to the base, take into account the value which the refiner realizes from the refinery foots or soapstock.

The refining losses vary from as low as about 1.0 percent on some degummed oil to as high as 10 or even 15 percent on crudes which have been improperly processed or which contain a large proportion of sludge; such crudes usually have abnormally high free fatty acid content, or high break content, or both. In other words, generally speaking, the amount of the refining loss is determined by the amount of free acid and/or non-fatty impurities in the crude. Ordinarily, the percentage of free acids does not vary through nearly as wide a range as in the case of other vegetable oils and we find accordingly that it is the amount or character of the phosphatides which largely determines the refining loss on most crude soybean oil traded. Now it is well known that the phosphatides may be largely dispersed or dissolved in the oil, or in certain cases they may have been largely coagulated and hence in that state suspended in the oil, or concentrated near the bottom of the tank, if indeed they have not deposited. We are sure that all persons who have had anything to do with shipping or receiving crude soybean oil fully appreciate the problems which have been posed by this tendency of crude soy oil to deposit sludge in storage tanks and tank cars. It has resulted in economic waste and been the source of much trouble and inconvenience. It is the one single thing, particularly in the case of improperly processed oil, which makes the drawing of a representative sample of crude soybean oil a most difficult operation under some circumstances.

It is recognized that by the exercise of ordinary care and by following the prescribed methods faithfully, very accurate samples can be taken of any crude soy oil at the time of loading a tank car, whereas it is also conceded by processors and refiners alike, that it is an extremely difficult matter to obtain a representative sample from a

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tank car containing footy soybean oil, as at destination. In fact, it may be said that under certain conditions it is practically impossible because of the quantity of foots present to obtain a representative sample from the tank car using the only official method available. That is to say, to draw a sample from the tank car containing foots which are soft enough to enter the trier, and include the *correct amount* of foots in the sample; i.e., in exactly the same proportion as they occur in the tank car, is a sampling operation and a problem which has not yet been solved by the adoption of a suitable method embodying the mathematical precision necessary. Therefore it was a recognition of this principle (see principle 3 below) both on the part of processors and refiners that led to the designation of the loading sample as the official sample. It is accordingly incumbent on the shipper to take whatever pains may be necessary to insure getting a correct loading sample in accordance with the official methods. It is necessary for both the shipper's and the buyer's protection. And this brings us to a consideration of the wording of the rule itself.

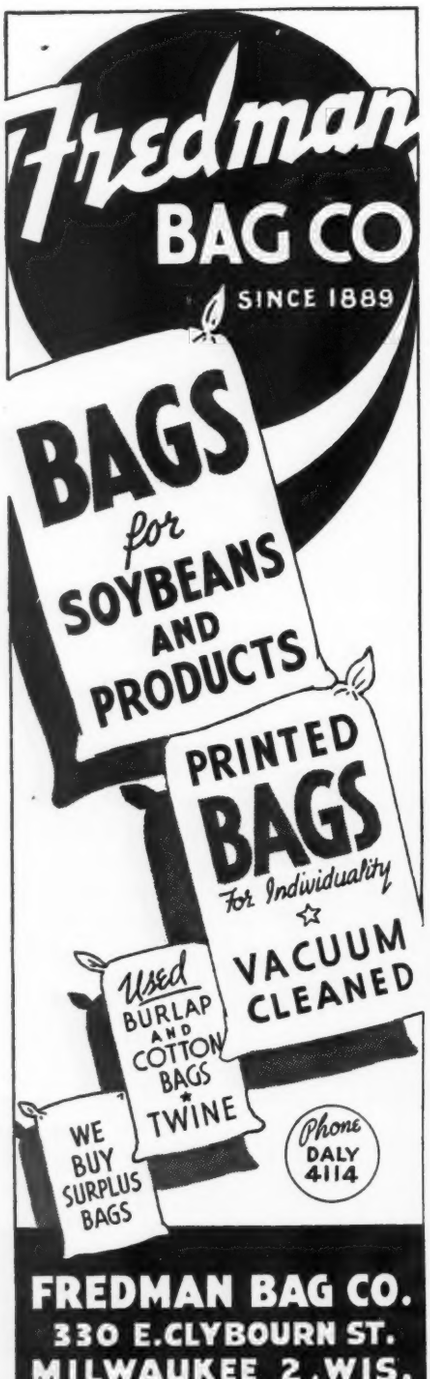
Paragraph H, Official Sample, reads:

"At Buyer's request Seller shall forward one of the one-gallon official loading samples within one working day of completion of loading. The official sample shall be a sample drawn at time of loading by a qualified sampler in accordance with the A.O.C.S. Official Method for sampling crude oils (C 1-41) and shall be so indicated on invoice. If the Seller neglects to provide such a sample at the time of loading or fails to show on invoice that an official sample has been taken, a sample drawn at destination shall be official when taken in accordance with the A.O.C.S. Official Method as noted above."

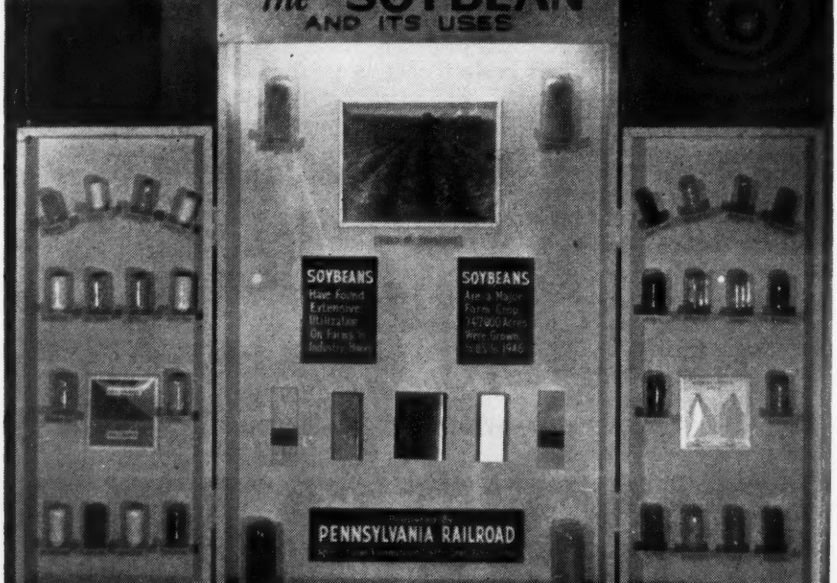
It is worth while to take this paragraph apart. Notice the opening words, "At Buyer's request . . .". We believe that all buyers will quickly come to an understanding with shippers from whom they receive crude soybean oil, to receive portions of the official sample taken at loading. However, whether buyer requests loading samples or not, we believe that it is to the processor's interest to take and retain a loading sample of each tank car shipped using the official method. For mark well the statement, "If the Seller neglects to provide such a sample at the time of loading or fails to show on invoice that an official sample has been taken, a sample drawn at destination shall be official when taken in accordance with the A.O.C.S. Official Method as noted above." Considering what has already been said about the difficulty of obtaining a correct sample of crude soybean oil which may contain tank bottoms or sludge, when drawn from the tank car at destination, it is not necessary to elaborate further on the importance to the seller of regularly drawing loading samples and advising the buyer of their availability, as provided here. A little thought will convince one that in case of a serious discrepancy in quality between results obtained on a core sample at destination on the one hand, and on a correctly-drawn loading sample on the other—specifically when there may be foots in the tank at destination—then the destination sample will indicate the poorer quality. This follows from a consideration of the composition of a vertical core taken through a cylindrical section in relation to the composition of the tank car when foots are present.

It is appropriate to mention in this connection, however, that the likelihood of discrepancies between the destination and the loading samples decreases as the quality of the crude oil improves. That is, in the case of well settled oil in which there are no coagulated phosphatides, a destination sample is likely to be just as representative as a loading sample; and of course in the case of degummed oil the problem outlined above becomes negligible.

Note carefully the term "qualified sampler". In time, it is expected that there will be available throughout the soybean growing belt official samplers who will be appointed



This is the newest portable soybean exhibit of the Pennsylvania Railroad. It was part of the Illinois Education Association exhibit at the National Education Association convention in Cincinnati. Claude E. Vick and Wendel C. Kennedy of the Illinois Association say the exhibit was a "huge success."



such on the basis of having demonstrated their qualifications to draw official loading and destination samples; but until that time comes it is up to the processor to train one or more individuals at his plant so thoroughly in the official method and its execution that there may never arise any doubt in the buyer's mind that the sample has indeed been taken by a *qualified* person. In fact it is apparent that no matter how determined a processor may be to abide by the recommendations of this article to take correct loading samples, his good intentions can be largely nullified if he does not at the outset see to it that the men in his plant who take these samples and whom he considers are "qualified", are indeed qualified to do so. Experience has shown that, simple as taking the loading sample may be, and accurate as it *must* be when the method is followed correctly, it is still possible for a careless workman to make a mistake which results in a non-representative sample. Some of the ways in which errors can be made are mentioned briefly below, following the methods.

A.O.C.S. Official Method C 1-41

Scope: Applicable to the sampling of animal and vegetable fats, and crude and refined vegetable and marine oils.

A. APPARATUS:

1. Core sampler for oils and liquid fats (Official Trier of the National Cottonseed Products Association), a metal tube of 2-inch diameter throughout. The length must be sufficient to take a cross-section through the entire depth of oil, ca 10 feet for tank cars. One end of the trier is fitted with a tight valve which allows an unrestricted opening 2 inches in diameter when fully opened and free from leaks when closed. The valve is opened and closed by means of a rod from the top of the trier. The trier is so constructed as to take a sample within ¼ inch (or less) of the bottom of the tank. Such a sample suitable for tank cars may be obtained from the Refinery Supply Company, Tulsa, Oklahoma.

C. GENERAL PRINCIPLES:

1. It is impossible to write directions for sampling fats and oils that will encompass all conditions and circumstances that may confront the individual charged with the responsibility of taking the sample. There are many instances in which the experience and judgment of that individual must prevail. There are, however, certain general rules which must always govern if the sample is to be representative.

2. The best sample of bulk oil quantities can be taken if the product to be sampled is completely liquid and thoroughly mixed. In such cases, a core sample or even a sample dipped from the tank while undergoing vigorous agitation will be representative.

3. Settled material in which the water and solid impurities are likely to be concentrated at the bottom is difficult to sample and reconstitute in proportional quantities. The contour of the tank must be taken into account. If the bottom of the tank is smaller than the middle or top, or vice versa, a core sample is not adequate. To overcome this, the number of portions from each section (e. g. each 1-foot level) should be regulated in reverse order to the cubical capacity of each section. For example, if the bottom 1-foot section is one-fourth of the middle 1-foot section, then one 1-foot sectional sample should be drawn from the middle section. These portions are then composited into one sample and mixed.

4. All samples must be completely labeled for identification.

D. PROCEDURE:

(a) *Petcock Method for Sampling Tanks or Tank Cars During Loading or Unloading.*

1. If the conditions are suitable, this is a very satisfactory method of sampling. This method is applicable only if the product is completely liquid, free flowing and does not contain any material that may plug the petcock.

2. A petcock ⅜ inch minimum inside diameter and bleeder line is located in a vertical section of the pumping line through which the product is continuously flowing.

3. Adjust the petcock so that a continuous stream of sample flows freely without dripping during the entire pumping period.

4. Collect the sample in a clean and dry container and protect from dirt, water or other contamination. Mix the entire sample thoroughly so as to obtain uniform distribution of moisture, meal and any other impurities and then fill three clean and dry one-gallon containers to an outage of about two inches.

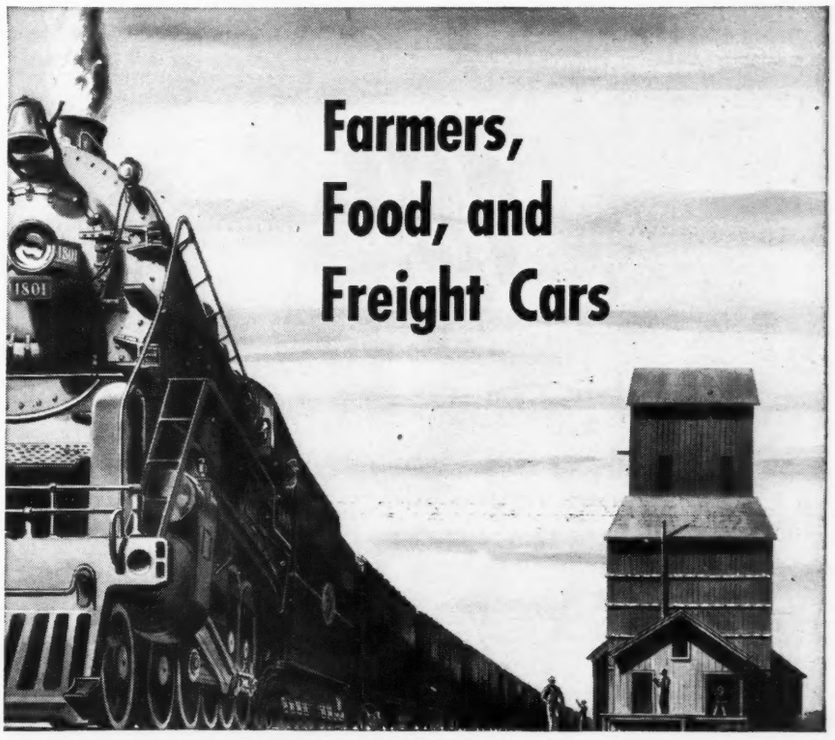
(b) *Grab Method for Sampling Tanks or Tank Cars During Loading or Unloading.*

1. Use a dipper or any other convenient container and withdraw about 1 lb. from the discharge end of the pipe at regular intervals as the product is entering the tank.

2. Collect, mix and distribute as directed in (a) 4.

(c) *Loaded Tanks or Tank Cars—Liquid Contents (Official Method of the National Cottonseed Products Association.)*

1. Lower the official oil trier vertically through the oil at a uniform rate with the bottom valve completely open, so that 10



● A billion bushels of winter wheat alone—besides huge crops of spring wheat and other foodstuffs! That's the American farmers' answer to the challenging needs of America and the world. And while the farmers have done this tremendous job, the American railroads have been doing *their* part in the work of feeding and supplying the world.

The railroads have carried, so far this year, more grain than ever before in any corresponding period in history. They are hauling more tons of freight more miles than ever before in peacetime. Since V-J Day the railroads have ordered more than 160,000 new freight cars. But not enough of these cars have been delivered, so far, to replace those worn out in wartime service.

More cars are on the way. Until they arrive, however, there are bound to be some delays in furnishing all the cars needed to move this year's crops. But the railroads — with the continued help of the shippers — will keep on doing their utmost to speed the products of our farms to the nation, and to a hungry world.

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to 15 seconds will be required to reach the bottom of the car (see Note 1). Close the bottom valve and withdraw the tube. Take several portions in this manner and empty into a clean and dry container.

2. Take several portions in this manner and then proceed as directed in (a) 4 above.

E. NOTES:

1. It is necessary that as the trier is lowered into the oil, the rate be slow enough so that the level of oil inside and outside of the trier remain the same. Otherwise, an unduly large portion will be drawn from the bottom which is likely to contain a considerable concentration of moisture and settlings.

COMMENTS:

It should be mentioned that *only those parts of the designated methods are given here as are applicable to crude soybean oil.*

In regard to the destination sample, it is to be noted that of the three methods given, only (c) is applicable at destination before unloading; and as indicated above this method is the official one to use when a loading sample has not been taken. Method (c) will yield a good loading sample if applied immediately after completion of loading when material is present which would settle out in time. This method possesses the advantage that the entire sample is taken at once and the actual drawing should not require more than five to ten minutes, if that. Thus, a workman's attention need not be required at regular intervals over the loading time, as in method (b).

PRECAUTIONS:

In the case of the petcock method, it should be emphasized that the cock or bleeder line should be checked from time to time to see that it has not plugged. It is considered that the sampling of footy soybean oil by this method will require close supervision and the exercise of precautions to prevent such plugging, since sometimes part of any foots present may occur as small lumps.

ADVANTAGES:

When the bleeder line is properly located and insurance taken against plugging, this is perhaps the most convenient method, inasmuch as it does not require the almost constant attention of a workman during the time of loading a tank car, as does Method (b).

METHOD (b):

This simple method is capable of yielding a very accurate sample if it is closely followed. However note carefully the words "regular intervals". Crude soybean oil is sometimes loaded from nearly empty storage tanks so that the amount of foots going through the loading line during the first part of the loading period may be quite different from the amount during the latter part. In fact, this may occur when foots are present even in a full tank, depending upon the location of the draw-off line. When suspended foots are known to be present in the oil to be loaded, therefore, it is doubly important that the "grabs" from the loading line be taken at *regular intervals.* Adherence to this requirement is a matter on which dependence must be placed on the integrity and alertness of the workman assigned to draw the samples. And such qualities as *integrity* and *alertness* are implied in the important term mentioned above, "qualified sampler".

SUGGESTIONS FOR HANDLING SAMPLES:

Marks. Identical tags or labels should be securely attached to all portions of the tank car sample. It should be mentioned that ordinary gum stickers do not remain fastened to tinned surfaces. Paper labels therefore should be attached by use of Scotch tape or by sticking them on a strip of gummed paper binding tape completely encircling the can. It is recommended that printed forms (or a rubber stamp form) be used for tags or labels; but whether or not such a form is used, the mark or sample identification should cover the following information:

Name and location of the mill shipping the oil
Name and location of the plant receiving the oil
Tank car number
Date shipped
Statement that it is a loading sample of crude soybean oil, naming the **type** as to whether expeller, hydraulic, extracted, or degummed.

A form which has proven satisfactory is given below:

LOADING SAMPLE OF
(kind) CRUDE SOY OIL
THE JOHN DOE SOYBEAN PROCESSING CO.
Beanfield, Ohio

Tank Car .....
Loaded ..... 19.. Shipped..... 19..
To .....
at .....

Taken by American Oil Chemists' Society Official Method

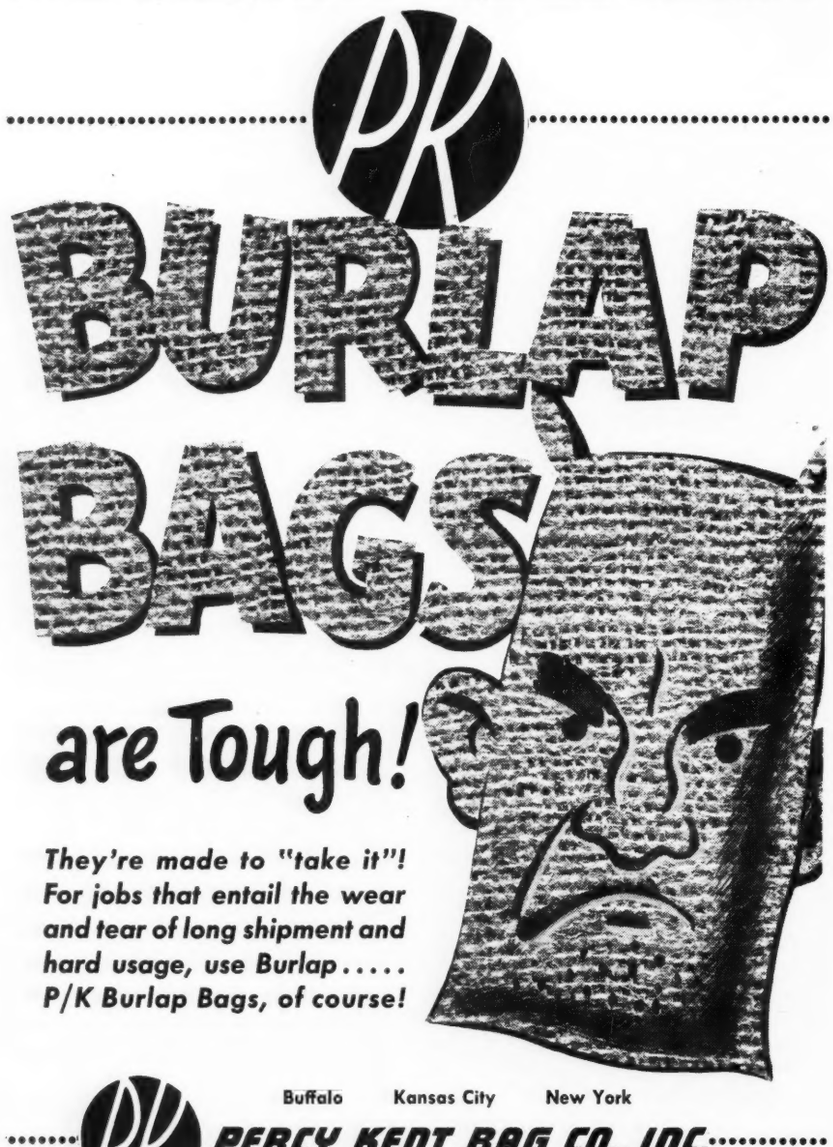
It is quite important to designate the type of the oil being shipped, as this determines some of the conditions used in making the refining loss determination.

It is urged that when the loading sample is sent to buyer, it be mailed as promptly as possible, especially at weekends when most delays occur. The reason for this is that many refiners want to examine or test the oil before unloading the car.

It is further suggested that processors anticipate their needs in gallon cans for the samples, considering the possible slow delivery that may be encountered. It is convenient to order also corrugated cardboard shipping cartons fitting the cans, as some of the suppliers of cans will also supply these cartons.

Finally, it is desirable also to anticipate the *storage* of retained tank car samples, considering the much larger storage space requirements after October 1. It is well to provide suitable shelving for storing samples in some orderly manner, whether according to buyer's name, or by date sequence irrespective of the buyer's identity.

EDITOR: Copies of the Official A.O.C.S. Sampling Methods as reproduced here may be obtained by requesting them from the National Soybean Processors Association, 3818 Board of Trade Building, Chicago 4, Illinois.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BOOKS

THE NEW FIBERS. By Joseph V. Sherman and Signe Lidfeldt Sherman. 538 pages. Price $5.00. D. Van Nostrand Co., 250 Fourth Ave., New York. Or order through *Soybean Digest*, Hudson, Iowa.

All people concerned with the rapidly developing field of fibers will be interested in this book. It provides in one volume information about the many new synthetic fibers, new rayons, and improved natural-fiber textiles.

The idea of man-made fibers in addition to the natural ones of cotton, wool and silk, may seem new and revolutionary to many people. It is neither. Back in 1664 Robert Hooke was suggesting that fibers might be spun by man using methods similar to those of silkworms and spiders. It may not be remembered today that the first rayon was made before 1889.

But true synthetic fibers were not manufactured until about 10 years ago, when nylon and vinyon emerged. It takes a long time for new ideas to germinate!

All the new fibers are in early stages of commercial development. They are the fibers of the future.

Soybean — or azlon — is among the protein-base fibers discussed. These include casein, peanut, corn (zein), egg albumen and feather fibers. The author classes them as semi-synthetic or manufactured fibers to distinguish them from the true synthetics such as nylon and the resins.

Soybean is the first protein fiber made directly from the vegetable world rather than the animal. It should sell at about the same price as casein fiber and find its principal markets in blends with cotton, wool and rayon.

The Drackett Co., manufacturer of the soybean fiber, expects soon to maintain a limited scale of commercial production.

—s b d—

China's soybean acreage for 1947 amounts to 9,989,000 acres compared with 9,968,000 acres last year, reports *Foreign Crops and Markets*. China's total soybean plantings are about 40,000 acres under last year.

NEW USE FOR PLANE

W. B. ALLINGTON

Mark up another use for the airplane in agriculture.

W. B. Allington, plant pathologist of the U. S. Department of Agriculture, is using an aerial survey to spot evidence of a fungus disease—brown stem rot—that is reducing soybean yields in the Midwest.

Allington, who is stationed at the Regional Soybean Laboratory, Urbana, Ill., used his privately owned plane to make aerial photographs of soybean acreage over a wide area late last summer. In the pictures, plants in infected fields show up much lighter in color than those in non-infected fields.

The photographs serve as the basis of a survey of the disease. By comparing his aerial pictures with road maps, Allington locates the fields where the fungus infection appears to be most serious. Then he follows up with a visit to the farm.

The survey made last summer has provided clues which may lead to the solution of this soybean disease problem.

Many of the photographs show a sharp line of demarcation between healthy and diseased areas. The line of separation usually coincides with the boundary of an adjoining field. Ground inspection and cropping history disclose, in every case, that the diseased fields were cropped to soybeans the last 3 years. On the non-infected fields, the farmer as a rule had practiced a 4-year rotation, such as corn, soybeans, oats, and clover.

The sudden appearance and destructiveness of brown stem rot, which is a soil-borne fungus disease, appears to be a direct result of the wartime practice of alternating corn and soybean crops with no small grain intervening. Agricultural scientists believe good rotation practices will probably enable farmers to control brown stem rot.

Introduce New Ford Tractor

Michigan farmerette, Gloria Swanson, tries out the new Ford tractor at Dearborn Motors educational farm, Clarkston, Mich.

The new Ford tractor, with a quality line of farm implements especially designed for use with it, were introduced by Dearborn Motors Corp. at a demonstration July 9, at Deer Lake Hills Farm, Clarkston, Mich. Several hundred representatives of the farm press attended the demonstration.

Frank R. Pierce, president of Dearborn Motors, said the corporation expected to market more than 50,000 of the tractors, and approximately 200,000 farm implements during the last half of 1947.

Major improvements have been made in the new Ford tractor, including a new hydraulic system and linkage attachment for implements, with drawbar height control mechanism. A fourth forward speed has been added, giving a higher speed and wider range of working speeds. The tractor maintains the basic design of an all-purpose, light-weight tractor adaptable to virtually all farming conditions.

The color scheme of the new tractor is light gray and vermilion red. All Dearborn implements will be vermilion red. Implements now in use with Ford tractors will operate with the new model 8N.

Dearborn Motors Corporation was formed in November of last year as a national marketing organization for the Ford tractor and the Dearborn equipment line.

RAINS, LATE FROSTS NEEDED

With over a million more acres of soybeans in the ground than last year, a record-shattering yield this fall is a possibility—but the crop must have all the weather breaks. This means plenty of sunshine, the right amount of moisture and late frosts.

With considerable July-planted acreage, maturity averages from 1 to 4 weeks late over most of the soybean-growing belt. An earlier-than-normal frost will catch a large acreage.

The crop is growing rapidly. Most fields are clean. But growth in the late-planted fields will be short. And the very early varieties planted in July in drowned-out sections will average lower in yield than the varieties normally planted.

Drouth conditions reported in many areas are not yet serious, but August rains are needed to maintain yield prospects.

Some grasshopper damage is reported.

Reports from *Soybean Digest* correspondents follow, for July 28 unless otherwise noted:

ARKANSAS

Jacob Hartz, Stuttgart, for east central: (July 26) Acreage slightly larger than 1946. More July planting than usual. Crop off to fine start with plenty of moisture. Most beans in rows and clean cultivated. 5% or less for hay or forage.

L. M. Humphrey, R. L. Dortch Seed Farms, Scott, Ark., for Little Rock area and central: About 5% July planted acreage. Maturity about normal. Recently retarded somewhat by very dry conditions. Yield outlook good if rain falls during next 2 weeks and temperatures not too high. Acreage slightly increased over 1946. Most beans in this area reasonably clean. Drought if unrelieved will become serious in 2-3 weeks. Some damage in early July from worm locally called garden web worm. Damage limited to spots and easily controlled. Less than 4% for hay or silage.

ILLINOIS

Gilbert F. Smith, Mahomet for east central: Total acreage about same as 1946. Maturity 2-3 weeks late. 25% would be caught by early frost. Weeds will affect yield in 5-10% of fields.

Russell S. Davis, Clayton, for west central: Are three distinct stages in soybean crop here. A small part was planted with corn planter about middle of June. These fields look quite promising. A little larger portion was seeded the last days of June, both with corn planter and drill, that got a flood on them before they came up. These fields are crusted deep and hard. Stands are uneven, and weeds thriving. And lastly half or more of total acreage was seeded during first half of July in seedbeds that are more or less cloddy. Most of this is fair stand and not many weeds. No rain in July, coupled with a week of very cool nights, has delayed growth on all three groups. Total acreage about same as 1946. Bulk of crop is under 10 inches high. It should be in bloom. Looks like 15 bu. would be most we could expect for yield. Half or more would be caught by early frost.

A. J. Surratt, Illinois and U. S. Departments of Agriculture, Springfield: (July 25) Acreage 7% above 1946. 15% planted in July, will not mature unless frost delayed week later than average killing frost dates. Maturity averages 10 days to 2 weeks later than usual. Yield outlook for 20 bu. Varying showers to date in July. Subsoil moisture up to average, but topsoil too dry and hard in part of state to fair on 40% of state acreage. Fields range from fairly clean to more clean than usual. Loss of yield from weedy conditions should be less than average unless prolonged summer drought follows. Aside from lateness and widely varying height of stands from short to normal, present condition of Illinois soybeans is well above average. Good general rain now needed to continue favorable growth. Progress of crop a little later than rather similar cool season in 1945 and little earlier than warmer and better growing season of 1943. Average height of stands at 13 in. July 18 was slightly better than in 1943 and close to that of 1946. I missed getting 1945 record for July 18. I cite this to show that crop has been growing well to date and record for height of stands is somewhat more optimistic than planting progress records. But this is another late crop and danger of frost is greater than usual.

McLaughlin Agricultural Service, Decatur, for vicinity: (July 25) The few fields plant-

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Jay Bee of Texas .....1904 S. Akard St., Dallas, Texas
Douglas W. Palmer, 3808 44th Ave. S.W., Seattle, Wash.
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ed in July will mature if we have late frost. Maturity 75% of normal. Yield outlook only fair at present. Some fields need rain badly. Fields fairly clean of weeds yet due to late planting. Percentage of hay smaller than usual due to good hay.

J. E. Johnson, Champaign, for Champaign and adjoining counties: (July 30) Maturity 2 weeks late. Total acreage 5% above 1946. Yield outlook fair average. Need rain. Ground dry and cracking. Weedy fields will be negligible factor. Not over 20% would be caught by early frost. Bud blight and brown stem rot will show later. Latter will take tremendous toll. Estimate crop at 85% as of August 1. Outlook for soft corn far more serious than any frost damage to soybeans.

INDIANA

Ersel Walley, Walley Agricultural Service, Fort Wayne, for northwest Ohio and northeast Indiana: On account of inability to get oat and corn acreage out, 1947 soybean acreage largest yet. Most acreage off to good start but 2-4 weeks late. With sunshine, showers and late frost—too much to hope for—1947 crop will exceed any previous one. With dry August and early frost crop would be really shot.

Peter J. Lux, State AAA, Indianapolis: Very little July planted acreage. Late planted soybeans don't look too good. Crop in general improved during month. 50% of crop should yield well above normal. Acreage 6% above 1946. Plenty of moisture.

J. B. Edmondson, Danville, for south central: 5% of acreage planted in July. Total acreage slightly above 1946. Maturity probably 2 weeks later than normal. Many early and medium early beans blooming. Yield will be cut 20-25% due to shorter growth of late plantings. 30% would be caught by early frost. Moisture conditions perfect for rapid growth past 3 weeks. Rowed beans are fairly clean of damaging weeds. Growing number of brown, unthrifty potash starved spots showing up in fields of lower fertility, particularly late plantings. I am not at all pessimistic about crop prospects. More than once, I've been down in dumps when things looked a little blue, only to feel a bit guilty when crops came through with good score. Old Mother Nature doesn't follow a rut, but she manages somehow to keep on a pretty even keel.

K. E. Beeson, Indiana Corn Growers Association, Lafayette: (July 26) Growth has been slow. No accurate yield estimate possible this early. Moisture condition generally good. Crop fairly free from weeds. Evidences of nitrogen and potash deficiencies beginning to show.

IOWA

H. E. Hazen, State PMA, Des Moines: (July 30) Some July planted acreage on flooded land and in southern Iowa. Most will mature as earlier varieties planted. Maturity 2 weeks late on average. Yield outlook 20 bu. Total acreage 110% of 1946. Moisture conditions dry all over. Late beans hurt. 25% would be caught by early frost.

Fred Hawthorn, Castana for western: (July 25) Maturity 1 week late. Beans have made good growth and are clean. Were laid by July 15. Moisture conditions good. Perhaps 100% would be caught by early frost.

John Sand, Marcus, for northwest: Yield outlook very good except for lateness. Total acreage about same as 1946. Moisture conditions dryer than normal. Weeds will affect yield only in low fields where cultivating was delayed by rains. 5-10% would be caught by early frost.

O. N. LaFollette, Department of Agriculture, Des Moines: Thousands of acres in flooded area planted in July. With normal season and early varieties prevailing they should mature. Some beans blooming while others 3 in. high. Maturity 75% normal over state. Overall yield outlook average but rain and late fall needed. Total acreage 15% above 1946.

EDITOR'S NOTE: We quoted Mr. LaFollette as reporting the state average condition at 30% in the July issue. He says the figure should have been 70%. Sorry.

KANSAS

E. A. Cleavinger, extension service Kansas State College, Manhattan, for eastern: 20,000 acres planted in July will mature if frost not early. Maturity may be trifle later than normal. Yield outlook excellent. Total acreage same as 1946. Some webworm infestation.

KENTUCKY

Ralph Kenney, field agent in agronomy, Lexington, for Henderson, Daviess, McClean counties: (July 30) Much above average acreage planted in July, will mature with normal weather. Most of crop less than 10 days late. Yield outlook above normal. Total acreage equal to or larger than 1946 More weeds than normal in early third of crop; less in remainder due to rapid growth. 80-90% of acreage in Daviess and Henderson counties for seed. Probably half in McClean for hay.

MINNESOTA

John W. Evans, Montevideo, for southwest central: Soybeans beginning to blossom. From 10 in. up in height. Yield outlook fair to good. Moisture conditions gen-

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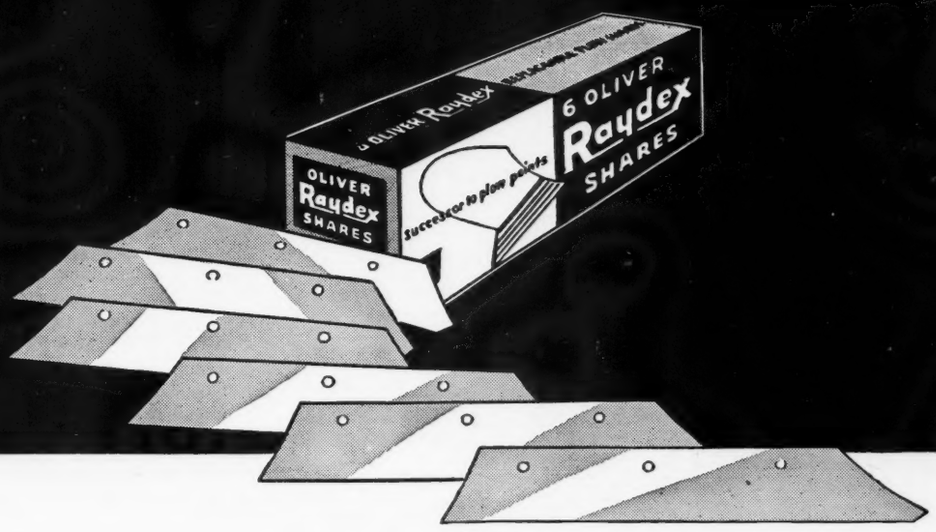

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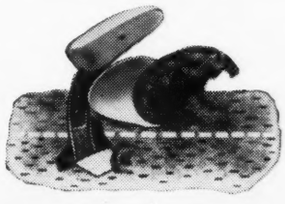

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erally good. Drove into northwest Iowa yesterday. Much variation in fields caused by excessive moisture in many places. Early planted fields all beginning to blossom irrespective of height which means lighter yields in considerable percentage of acreage. Soybean fields north of Montevideo to Fargo very clean. Many fields observed yesterday very dirty. Small grain crop very uneven, wheat being best. Oats very discouraging. With all new oat varieties being extremely high priced, farmer will plant less oats next year and more soybeans. How many beans can we stand?

R. E. Hodgson, southeast experiment station, Waseca, for southeast: (July 25) Maturity about normal. I would guess yield outlook about same as last year with small acreage increase over 1946. Moisture conditions good so far. Most beans I have seen are exceptionally clean of weeds.

Roy A. Bodin, agricultural statistician, St. Paul: Soybean production expected to reach a new high as acreage for all purposes has been increased 55 percent over last year.

MISSOURI

Harry A. Plattner, Malta Bend: (July 26) More than average acreage planted in July, will mature if frost is late. Yield outlook for early planted soybeans is about 30 bu. Total acreage 10% above 1946. Rain needed at present. 25-30% would be caught by early frost.

E. M. Poirot, Golden City, for southwest: (July 26) Maturity about week late. Yield outlook good to excellent. Acreage about same as 1946. Moisture condition excellent.

J. Ross Fleetwood, extension specialist, Columbia: (July 25) July planted acreage will not mature unless season is longer than usual. Maturity 2 weeks late. Crop developing rapidly. At least normal yield in prospect. Acreage a record this year. Soil dry in most areas but not serious. 10-20% would be caught by early frost. Grasshoppers in a few areas.

NEBRASKA

John J. Weihing, department of agronomy, College of Agriculture, Lincoln for eastern: Maturity probably will be later than normal because of generally late planting. Due to weather not permitting corn to be planted in many fields, soybean acreage has increased considerably for Nebraska. Moisture conditions good.

NORTH CAROLINA

Frank Parker, agricultural statistician, Raleigh: Maturity normal. Yield outlook average with total acreage alone some above 1946. Moisture conditions too wet now. Weeds probably will affect final yields if wet weather continues. Looks like usual proportion for hay or silage.

NORTH DAKOTA

C. J. Heltemes, agricultural statistician, Fargo, for eastern: (July 24) Maturity week late. Same acreage as 1946. Good subsoil moisture. Topsoil getting dry. Soybean acreage we grow is in Red River valley. Until varieties are developed that are adapted to this area not likely our acreage will increase much.

OHIO

D. F. Beard, extension agronomist, Ohio State University, Columbus: (July 26) Considerable July planted acreage. Some planted in late June didn't sprout until July rains came. Your guess as good as mine as to whether this acreage will mature. Maturity 3 weeks behind on average. Yield outlook poor. Only ideal, or near ideal, weather in August and September can insure normal crop. Acreage about same as 1946. 50-75% would be caught by early frost. Beans on July 26 looked fine for normal July 4 condition.

PENNSYLVANIA

E. L. Gasteiger, agricultural statistician, Harrisburg: Maturity 2 weeks late. 20-30% would be caught by early frost. Yield outlook continues good. Moisture conditions excellent. Roughly 50% for hay or silage.

SOUTH DAKOTA

H. G. Miller & Son, Garden City, for Clark County: Maturity somewhat delayed due to late planting. Acreage probably 10-15% greater than 1946. Yield outlook favorable if we are not caught by early frost. Cultivating nearly completed. Blooming stage on. Soybeans have made wonderful growth past 10 days. Outlook very good. On June 27 hail damaged several fields and wiped out some entirely. Moisture to date sufficient. Rain needed. Some fields very weedy due to cold spring. Weeds did not germinate until soybeans were planted. 25% could be caught by early frost. No pests prevalent but we do have some leaf damage by disease—browning of some leaves. We do not know the cause.

WEST VIRGINIA

R. J. Friant, extension agronomist, Morgantown: (July 25) Maturity 2-3 weeks late. Yield outlook fair. Acreage same as 1946. Moisture abundant. Weedy condition will affect final yield, especially in Ohio valley. 95% for hay or silage.

VIRGINIA

Jenny M. Taylor, Department of Agriculture, Richmond: (July 30) Maturity about 10 days later than normal. Yield outlook average or better. Acreage slightly under 1946. Moisture conditions ample. 33% for hay or silage; 52% for beans; 15% other uses.

WISCONSIN

Geo. Briggs, Agricultural College, Madison: Maturity slightly late. Acreage same as 1946. Moisture conditions fair to good. 30% would be caught by early frost.

John P. Dries, Saukville, for southeastern: Maturity 2 to 3 weeks late. Yield outlook fair. Total acreage less than 60% of 1946. 75% would be caught by early frost.

Not all of the soybean crop is behind schedule this year. This field, belonging to Harry W. Plattner, Malta Bend, Mo., was planted May 25. Picture was taken July 15.

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Publications

Length of Day

STUDIES ON THE LENGTH-OF-DAY. By H. A. Borthwick, senior botanist. *Industry-Research Conference.* Agricultural Research Center, Beltsville, Md.

Length of day determines the time of flowering and fruiting in many plants. All soybean varieties bloom promptly on short days, but certain ones fail to flower if days are longer. Chiefly for this reason, individual soybean varieties are grown in narrow belts across the country. Fortunately, we have varieties adapted to all these belts. By choosing the proper one for each region, we can grow the crop from Canada to the Gulf.

If a variety is grown north of its proper range, the plants become viny and late maturing because summer days are too long. If it is grown south of its range, the plants bloom too early and mature as small bushy plants because the days are too short.

Experiments show that the leaf is the part of the plant that is sensitive to day length. Apparently a substance is formed in the leaf under favorable day lengths which moves to other parts of the plant where it causes flower formation. We do not know what this substance is but it is evidently formed during the long dark periods and is destroyed by light. Thus, flowering of soybeans that are receiving short days and long nights can be prevented if the nights are interrupted near the middle with brief periods of light.

At Beltsville four growth chambers have been built in which plants can be grown to maturity under entirely artificial conditions.

At the present time a detailed study is being made of the effects of various wavelength bands of light on the flowering reaction. A special spectograph has been designed and built for this work.

Soybean Futures

ECONOMIC SIGNIFICANCE OF THE FUTURES MARKET FOR SOYBEANS. By Forest Glen Warren. Abstract of a doctor's thesis in the graduate school of the University of Illinois, Urbana.

Prior to the reopening of the soybean futures market on the Chicago Board of Trade July 7, active trading in soybean futures on the Board of Trade covered a period of less than 6½ years—October 1936 to February 1943. It was terminated by government controls during the war.

The trading was small for the first 3 years. A spectacular increase occurred in 1940 and 1941. Total volume of trading in 1939 was 20 million bushels, but by 1941 it had increased to 994 million bushels. At that time trading in soybean futures was outranked only by the trading in wheat futures. Factors that caused the increase in soybean trading included the tremendous increase in soybean production, and the fact that government farm programs brought about a decrease in trading in other grains. A result was that traders became interested in other markets, such as the soybean market.

The writer believes the marketing of soybeans by farmers is facilitated directly by the futures market. He says an active futures market, by providing hedging facilities, tends to reduce price spreads.

Foods

THE EFFECT OF SOYBEAN LECITHIN ON THE STABILIZATION AND UTILIZATION OF VITAMIN A AND CAROTENE. With bibliography. By Albert Scharf, American Lecithin Co., Atlanta, Ga. *Food Materials and Equipment,* June 1947.

The problem of stabilizing fats and fat-soluble vitamins and preventing premature oxidation has received considerable attention in recent years. A number of substances have been found effective in this respect; and numerous reports have been published and patents issued.

Soy lecithin has been used for a number of years as an antioxidant in lard, shortenings and vegetable oils and in some vitamin A preparations.

Commercial soy lecithin is a natural complex extracted from soybeans and contains many physiological factors. Further research is necessary to identify all of them.

Sufficient evidence has been accumulated to indicate the addition of soy lecithin as an antioxidant in food or feed preparations containing vitamins subject to oxidation. In addition, it will improve absorption and utilization of some factors.

DETERMINATION OF SOYBEAN FLOUR IN CEREAL PRODUCTS. By V. E. Munsey, Food and Drug Administration, Washington, D. C.

Soy flour is used in pancake mixes, wheat-soy macaroni products, bread, semi-sweet bakery products, and crackers.

The application of a serological method for estimating soy flour in cereal products is described. Similar methods have been published for the determination of soy flour in meat products.

This method is satisfactory for the determination of soy flour in pancake mixes and wheat-soy macaroni if the soy flour used is available for a control. Otherwise, it affords only an approximate estimate. The method has a limited application to bread containing soy flour.

Mississippi

SOYBEAN VARIETIES IN THE MISSISSIPPI DELTA. By Paul R. Henson and Robert B. Carr. *Mississippi Farm Research,* June 1947.

Soybean variety tests were conducted at the Delta Experiment Station and three other locations in 1946.

S100 continues to be the leading early variety for the Delta. Enough seed of this variety should be available for planting in 1948. Gibson and Patoka have yielded well

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over the 3 years, 1944-46, but both are inferior to S100 in yield and seed quality.

The yield of Ogden is well above that of other varieties of early-October maturity. Its chief drawback is that it will shatter under dry conditions, particularly on sandy soils or soils of low fertility.

Roanoke and Volstate are the leading late-October varieties. Both produce excellent yields of seed high in quality and oil content.

Mamotan, Mamloxi, Acadian and Nanda are the highest-yielding varieties of early-November maturity.

EDITOR'S NOTE: For a more complete discussion of Delta varieties, see article by Robert B. Carr in *Soybean Digest*, page 12, July 1946.

Technical Soy Flour

HOW TO EVALUATE TECHNICAL SOYA FLOUR. By Glenn Davidson and James H. Cagle. *Paper Industry and Paper World*. June 1947.

The consumption of technical soya flour by the wallpaper and paper coating industries amounts to several million pounds annually. But in spite of this relatively large consumption, apparently no methods of evaluating the product have been published previously.

The article describes the so-called pat test for measuring the heat sensitivity or denaturation of the soy flour protein through heating, a critical characteristic in the paper coating industry.

If a soy flour meets the pat test specification, the protein in it is as nearly undenatured as is obtainable thus far.

Texas

SOME OILSEED CROPS IN TEXAS. By E. B. Reynolds, agronomist, Texas Agricultural Experiment Station, College Station, Texas. 1066 *Progress Report*.

In view of the shortage of vegetable oils, the Texas Station had conducted numerous trials with oilbearing plants to determine their adaptation in the state.

Crops mentioned are flax, peanuts, sunflowers, sesame, safflower, soybeans and perilla. The author says soybeans have not yet been successful enough in Texas to be of much commercial importance as an oil crop.

Feeding

THE EFFECT OF FEEDING SOYBEANS AND SOYBEAN PRODUCTS ALONE AND IN COMBINATION WITH OTHER FEEDS ON MILK PRODUCTION AND MILK BUTTERFAT QUALITY. By C. Y. Cannon, D. L. Espe, and E. W. Bird. *Report on Agricultural Research*, 1946. Part I. Iowa Experiment Station, Ames, Iowa.

Study of the effects of soybeans and soybean hay on flavor of milk. This indicates that the flavors of milk which field workers have attributed to feeding soybeans probably are caused by some other factors.

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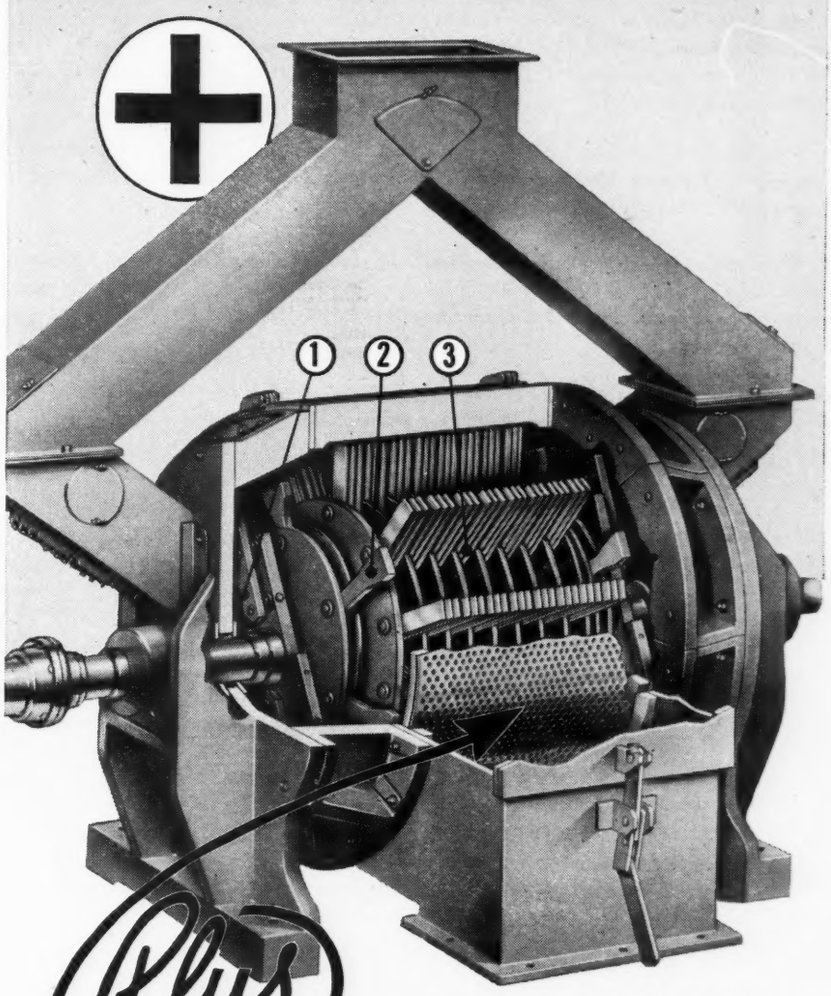

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GRITS and FLAKES... FROM THE WORLD OF SOY

Sale of the Mankato Soy Products Co. by the Washington Cooperative Farmers Association, Seattle, Wash., to Harold Jamieson and Lowell Andreas, was announced July 17. The new owners, formerly associated with Honeymead Products Co., Cedar Rapids, will crush both soybeans and flaxseed.

* * * *

Fire caused approximately $30,000 damage to the Galesburg (Ill.) Soy Products Co. plant July 1. It was the second major fire for the firm in 2 years. Exact cause of the blaze was not known. About 6,000 bushels of soybeans were stored in the elevator.

* * * *

Plans are now being made for the annual fall meeting of the American Oil Chemists' Society to be held at the Edgewater Beach Hotel, Chicago, October 20-22. General chairman will be G. A. Grapple, Wilson & Co., Chicago; Howard C. Black, Swift & Co., Chicago, is program chairman.

* * * *

"Drying Oils" is title of an article by Dr. Harold Wittcoff in the summer issue of PROGRESS THRU RESEARCH, *General Mills, Inc., publication.*

* * * *

C. W. Loomis, manager of the Bemis Bro. Bag Co. Memphis plant, has been transferred to St. Louis to assume important administrative duties in the firm's general offices. F. C. Chenault will succeed Loomis as manager at Memphis, and R. R. Duff succeeds Chenault as sales manager at the Memphis plant.

* * * *

R. R. Kalton, agent of the U. S. Regional Soybean Laboratory at Ames from 1944 to 1946, is now in charge of oilcrop breeding with the Texas Research Foundation, Renner, Texas. He will specialize in soybeans, but also will experiment with sunflowers, safflower, castor beans, sesame, perilla and others. Kalton completed work on his doctorate at Iowa State College this summer.

* * * *

Curtiss B. Mitchell was recently promoted to sales manager for the Norwalk, Ohio, division of Durkee Famous Foods. He will be in charge of Durkee's margarine for the eastern market and of Durkee condiments and spices in Ohio and Michigan.

* * * *

G. K. Whyte, who for several years has been connected with the St. Louis sales department of Chase Bag Co., will assume duties of the sales manager of the St. Louis branch, it is announced.

* * * *

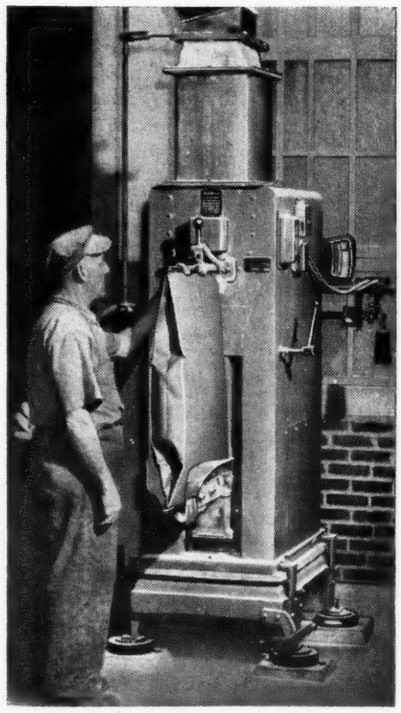
L. B. Hansen, of the oil mill and refinery accounting department, Chicago, has been transferred to the Swift & Co. Oil Mill, Cairo, Ill., as office manager. The Cairo mill is installing a new truck scale, and building a separate scale office and waiting room for customers.

* * * *

"Tough Going, but the Margarine Fight Makes Headway," is Etna M. Kelley's sympathetic account of the margarine industry's battle to overcome legal discriminations against the product. The article appeared in the June 15 issue of *Sales Management.*

* * * *

H. D. Ruhm, vice president of the Ruhm Phosphate & Chemical Co., was recently



MACHINE CUTS COSTS

This is the 100-LS valve bag filling machine of the St. Regis Paper Co., designed to meet demands by manufacturers for a low-cost machine that would give them the advantages of mechanized industrial packaging in multiwall paper bags. More than 100 units are in use in the chemical, food and feed industries, according to R. P. Bushman, vice president of the St. Regis Sales Corp. The machine is used for the packaging of more than 30 industrial products. It speeds up packaging operations, cuts down on labor costs, and container costs.

— s b d —

HUGE PROMOTED

W. E. Huge has been named vice president of the Central Soya Co., Inc., Fort Wayne, D. W. McMillen, chairman of the board of the company, has announced. In his new capacity Huge will have executive responsibility for the commodity purchases

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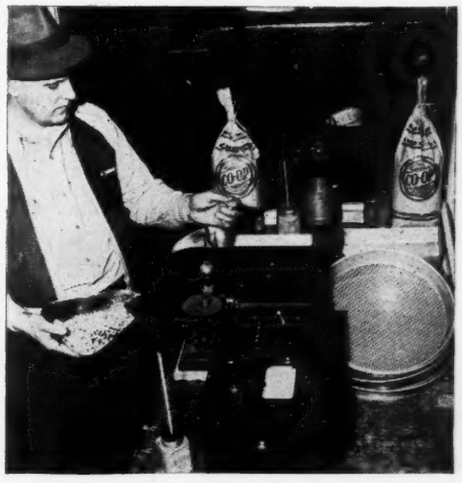

"ONCE the sample has been weighed and the temperature taken, a moisture test can be made in **a half minute**," says Mr. Martin Hallock, Jasper County Farm Bureau Co-operative Association, Rensselaer, Indiana. "Because of this we are able to **test every load** that goes over the scales, even in the busiest season, and have it made by the time the grain is unloaded . . . We also probe each car after it is loaded and run a moisture test so that we may compare our test with the government test. I have used a Steinlite for four and a half years to test wheat, corn, oats and beans. It has proved itself for both speed and accuracy."

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honored by the sales force of the firm and the Columbia, Tenn., Rotary Club. The occasion was presentation of a plaque recognizing Mr. Ruhm's 50 years' service to agriculture.

* * * *

Construction work has begun on a $400,000 addition to the Elmhurst, L. I., plant of Durkee Famous Foods. This is one of a series of such additions planned for the Durkee Division, but delayed by the war.

* * * *

Dwight L. Dannen, vice president of Dannen Mills, Inc., St. Joseph, Mo., has been admitted to membership in the Chicago Board of Trade.

* * * *

Consumers Soybean Mills, Inc., with general offices at Minneapolis, has moved to larger offices at 1122 Flour Exchange Bldg. The firm's plant is located at Lakeville, Minn., about 15 miles south of Minneapolis.

* * * *

Wilson Soybean Mill, Wilson, Ark., began operations on its new Allis-Chalmers solvent extraction plant July 2. This is the first soybean plant south of Kentucky to convert to the solvent method. Capacity of the new mill is 100 tons. Buster Driver is manager and Richard Pratt, superintendent.

* * * *

Oliver Fiala has been named technical director in charge of research, and Earl W. Miles, general superintendent of the margarine divisions of Durkee Famous Foods division of the Glidden Co. Both men will headquarter in Chicago under the direction of L. A. Spielman, general superintendent.

* * * *

WHAT'S BEHIND A BAG OF GOOD FEED *is a new book issued by the feed and soy division of Pillsbury Mills, Inc. It will be distributed to feed dealers, salesmen and buyers as an educational handbook of the feed industry.*

* * * *

A new associate of the Guillory Sales Co., Memphis, Tenn., brokers, is W. Jack Crutcher, who has been with the Wesson Oil & Snowdrift Co. for 18 years. He spent most of the war years on loan to the fats and oils branch of the War Food Administration.

* * * *

An attractive counter display on All-Purpose Cement is now sent out with each carton of the cement to dealers to the consumer trade, reports the Val-A Co., Chicago. The cement has many uses around home, farm and office.

* * * *

David Gordon & Co., Inc., chemical, mechanical and industrial engineers, 29 Broadway, New York City, announce the election of Mr. Gordon, previously with the M. W. Kellogg Co. and the Interchemical Corp., to the presidency of the firm July 16. The company is active in both domestic and foreign business.

* * * *

The B. J. B. Grain Co., new Toledo grain and feedstuff brokerage firm, has been incorporated. A. A. Bame, president of the Industrial Soya Co., John Buchanan, formerly with the A. E. Staley Mfg. Co., and Owen Jeffery, Paulding, Ohio, are owners.

and soybean oil meal sales of the company.

Huge started with the company in 1935, 13 months after its organization, as a clerk. He has advanced steadily and is regarded as a keen observer of market conditions.

McMillen also announced that W. W. Burhop resigned as manager of the soybean meal sales department June 30 to form his own brokerage business, dealing in a number of commodities used in feed manufacture. He will establish offices in Fort Wayne. Burhop had been with the McMillen interests for nearly 10 years.

B. A. Townsend, who has been assistant manager of the soybean meal sales department, has been appointed manager of the department to succeed Burhop.

—s b d—

DURKEE TO MERCHANT: SELL MARGARINE FRESH

Protect the flavor . . . sell it fresh!

The makers of Durkee's margarine have turned this vital plea into a new booklet just issued for the wholesale and retail trade.

"We ship it FRESH, you sell it FRESH . . . open case having lowest lot number first."

This admonition is printed on the side of each carton of Durkee's margarine and is the nucleus of the firm's new booklet.

Lot numbers on the cartons make it easy for the food merchant to keep an always fresh supply of Durkee's on sale.

Stressing that freshness is the essence of the Durkee flavor, the pamphlet shows the merchant how to display his margarine and how to store his supply away from other products which might affect its flavor.

—s b d—

OIL COMMITTEE

E. H. Tenent, Woodson-Tenent Laboratories, Memphis, Tenn., was appointed chairman of the gossypol analysis committee at the recent convention of the American Oil Chemists Society in New Orleans.

Serving on the committee with Tenent are: V. C. Mehlenbacher, Swift & Co., Chicago, Ill.; Dr. C. M. Lyman, Texas Agriculture Experiment Station, College Station, Texas; T. L. Rettger, Buckeye Cotton Oil Co., Memphis, Tenn.; Dr. E. W. Sewell, Proctor & Gamble Co., Ivorydale, Ohio, and W. T. Coleman, West Texas Cotton Oil Co., Abilene, Texas.

—s b d—

SOYBEAN ROASTER

Infra Roast, Inc., announces plans for use of its electronic roasters in the quick roasting of peanuts, soybeans and grains in retail and wholesale establishments, the *New York Journal of Commerce* announces.

August S. Torres, president, said the roaster, now being manufactured for the quick roasting of coffee in retail stores, can be used for roasting peanuts, soybeans and grains without any changes in its mechanism.

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WASHINGTON Digest

By PORTER M. HEDGE

Washington Correspondent for The Soybean Digest

Research Program In the windup on 1947-48 farm appropriations, the Senate and House compromised on 9 million dollars for the new Hope-Flannagan agricultural research and marketing act.

The funds are divided this way:

For payments to states 2½ million dollars.

For research on utilization of farm products 3 million dollars.

For improvement and development of the distribution and marketing systems 2 million dollars.

For cooperative research 1½ million dollars.

E. A. (Woody) Meyer, formerly associate director of Production and Marketing Administration, will be director of the marketing-research work.

The first project for which funds have been allocated is to finance development of a portable, low-cost, corn-drying machine suitable for average farm use this year.

In all, about 25 million dollars in proposed research under the new program had been mapped out in tentative form before the appropriations bill cleared Congress.

These projects, including over 1½ million dollars for research on feeds, will have to be scaled down about two-thirds.

A minimum of $20,000 is proposed for studies on farm storage of soybeans and flaxseed.

A minimum of $15,000 each is being proposed for grading oilseeds, and to study the economics of processing. Another $10,000 is being recommended for analysis of market news services for soybeans and flax.

In the feed research proposals, the following projects have been recommended:

To study oilseed meals with particular reference to removal of toxic substances and removal of injurious pigments; to conduct cooperative feeding tests on meals and vegetable proteins, $30,000.

To determine the utilization and feeding values for livestock of various byproduct feeds, grains, concentrate mixtures, etc., as affected by production changes, preparation, storage, processing and other treatments, $30,000.

Correction and prevention of nutritional deficiencies in cattle and sheep raised in deficient areas through the use of feed supplements, $30,000.

To develop and improve farm feed processing equipment, including shellers, grinders, mixers and elevators for more efficient use in feed handling on farms, $20,000.

To determine the feeding value for dairy cattle of various new feeds made from industrial wastes and byproducts, $50,000.

To appraise market news services on feeds and grains, $19,000.

To make monthly estimates on the interstate movement of the principal feeds, $25,000.

To collect and distribute basic world data on production, price, and stocks of feeds, $12,610.

Export Policy USDA will decide on export policy for protein meals early this fall when more accurate crop production estimates are available.

Until the late months of this year, exports of oilseed cakes and meals will be continued on the present "emergency" allocation basis.

The supply of all protein meals available from this year's crop is now estimated at about 6 million tons, compared with 5½ million tons last year.

The July 15 crop estimate indicated a supply of corn and oats available for feed during the coming year of about .72 tons per grain consuming animal unit. This is slightly better than in 1945, when the combined crops were bigger, but animal units also were larger.

Government policy on protein meal exports will be important to feeders, since the volume of shipments will have an important influence on domestic prices.

In the past, government officials have attempted to turn loose just enough protein meals from the domestic supply to keep the home price more or less on an even keel, and in line with other feed costs and past price relationships.

Latest allocation of oilseed cake and meal was 15,000 long tons to Belgium for shipment in the last quarter of this year, and to fulfill a commitment to supply meal in exchange for palm oil.

Plans for Next Year The official decision on 1948 acreage and production goals for soybeans is being postponed until late September.

One reason is to give fats and oils officials the benefit of another crop production estimate, from which oil crop supplies for the year can be better estimated.

However, a big part of the delay is uncertainty over future prices of vegetable oils. For a commodity like soybeans, the acreage goal and the government guaranteed minimum price support have to be considered together.

It seems pretty clear now that the flax goal and price support will be lower next year. There is less certainty about soybeans.

Parity price for soybeans is now $2.22 a bushel. At present parity, the price support for soybeans would have to be at least $2 a bushel, or 90 percent of parity.

This is so close to the present $2.04 support level officials may decide to make no change in the price guarantee for next year, even if the goal is reduced.

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Fats, Oils Allocations

The third quarter export allocation of fats and oils totals 153,100,000 pounds, 26,700,000 pounds less than for the same quarter last year.

Of the total, over two-thirds, or 110,200,000 pounds is for commercial export; the remainder for procurement by PMA for U. S. and British occupied zones and foreign relief programs.

The breakdown of the commercial allocation: Lard 35.5 million pounds, margarine 2.9 million, shortening and other edible oils 46.2 million, inedible fats and oils 14.8 million, and 10.8 million pounds of soap.

Nineteen million pounds of the total allocation is to be exported in exchange for other fats and oils needed in this country.

What amounts to a trade swap of soybean oil for olive oil has been approved by USDA. Exports of soybean oil will be licensed by the Commerce Department to Mediterranean countries which have a surplus of olive oil.

—s b d—

DEHYDRATION BEST

Dehydration offers the best way to preserve the distinctive flavor of green vegetable soybeans. The green-dried beans rate higher than canned soyas not only in flavor but also in color and texture. Mature dry soybeans provide more food value at lower cost than either the green-dried or canned beans.

These are the findings of plant scientists of the U. S. Department of Agriculture. They are based on a series of experiments in which the scientists scored 16 varieties of vegetable soyas for color, texture, flavor, and desirability when dehydrated or canned while immature, in comparison with beans allowed to become mature and dry on the plants.

Comparisons between the three products are hard to make because they differ so much in the character and quality of their flavor. Dehydrated green beans retain the characteristic flavor of the fresh vegetables with little alteration. Anyone who likes the fresh bean will also like the dehydrated green soya. Canning preserves the food value but changes the flavor and palatability of the beans. The mature dried beans lose all resemblance to the fresh vegetable in flavor but the nut-like quality of the dry beans, which has been compared to the flavor of chestnuts by some tasters and to popcorn by others, is attractive and palatable.

Results of the test show also that harvesting for dehydration is best done at the stage the beans would be used fresh. Green beans blanched before drying have a better flavor than those dehydrated without blanching.

Market Street

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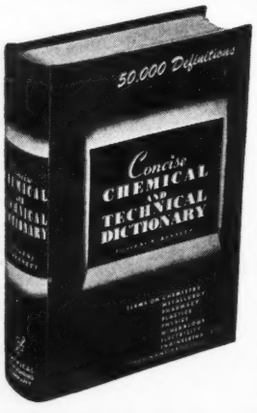

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In The MARKETS

SOYBEANS AND OIL MEAL STRONG; OIL FIRM DURING MONTH

Soybeans and soybean oil meal both advanced sharply during midmonth, oil meal reaching the highest point since November. Both commodities leveled off later, and November No. 2 soybeans sought lower levels the last few days of the month.

Soybean oil held its own against a generally declining fats and oils market.

The steep climb by beans and meal to higher levels followed immediately on publication of the U. S. Department of Agriculture's July crop report which indicated that corn and oats crops will be substantially smaller than last year.

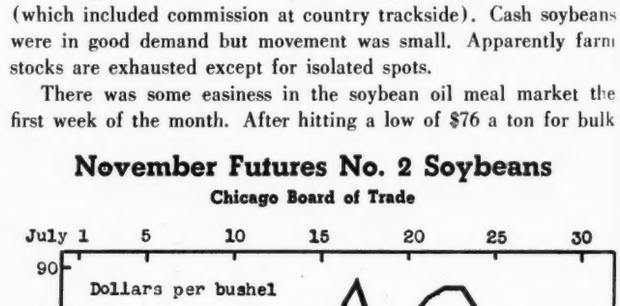
November No. 2 soybeans opened at $2.80 July 7. After sagging to $2.68 the 10th and 11th, quotations advanced to the month's high of $2.88½ July 17. Trading in soybean futures was extremely light following the reopening of the futures market by the Chicago Board of Trade. The first March quotation for No. 2 soybeans was $2.75, July 31.

Chicago bids for No. 2 soybeans ranged from $3.15 to $3.33 (which included commission at country trackside). Cash soybeans were in good demand but movement was small. Apparently farm stocks are exhausted except for isolated spots.

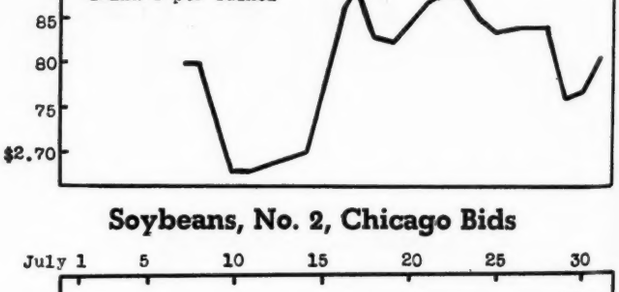
There was some easiness in the soybean oil meal market the first week of the month. After hitting a low of $76 a ton for bulk

November Futures No. 2 Soybeans

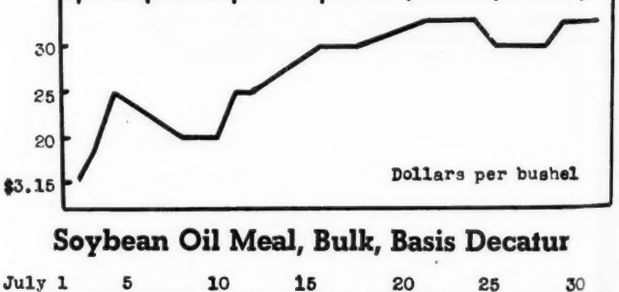
Chicago Board of Trade



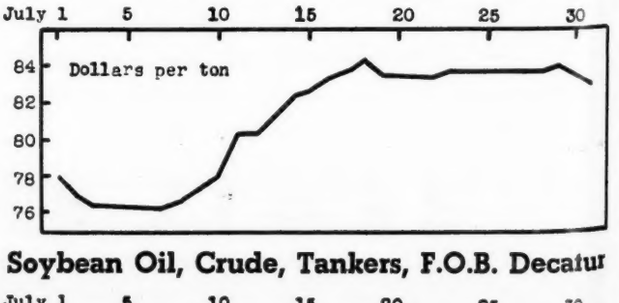
Soybeans, No. 2, Chicago Bids



Soybean Oil Meal, Bulk, Basis Decatur



Soybean Oil, Crude, Tankers, F.O.B. Decatur



meal, Decatur basis, July 7, oil meal climbed to the month's high of $85.25 a week later, about $5 above any June quotation.

Even with this sharp recovery, little soybean oil meal was offered. Production is said to be declining. This will probably continue until the new crop is available.

Some October-December oil meal was offered for booking during July. But there was little interest in new crop offerings and few futures sales were made.

There was good activity in spot soybean oil at the going price of 17 to 17½c for crude oil in tankers, F.O.B. Decatur. The government's program for exchanging U. S. soybean oil for foreign olive oil apparently had little effect on the market.

No sales of soybean oil were reported on the futures market maintained by the New York Produce Exchange.

SOYBEAN OIL MEAL FUTURES—MEMPHIS, JULY 31*

Contract—100 tons

Decatur—Bulk Basis—close		Decatur—Sacked Basis—close	
October	*$71.50	October	$77.00@78.50
December	61.00@63.00	December	‡65.75
January, 1948	60.00@61.50	January, 1948	64.50@65.50
March, 1948	60.50@61.50	March, 1948	‡65.00
Sales, none. *Bid.		May, 1948	‡64.75
		Sales, 600. ‡Flat.	

N. Y. SOYBEAN OIL FUTURES, JULY 31*

	close	pr. cl.
September	‡20.00	20.00
October	*17.25	18.00
December	*16.00	16.75
January, 1948	*16.10	16.75
March, 1948	*16.00	16.75
May, 1948	16.25	17.00
July, 1948	16.25	17.00

Total sales, none.

*Reported by Chicago Journal of Commerce.

• STOCKS OF SOYBEANS on farms July 1 are estimated at 6.3 million bushels, the lowest for the date in the 5 years of record, reports U. S. Department of Agriculture in its July 1 crop report. July 1 farm stocks have declined each year since 1943 when 13.7 million bushels were on hand. The disappearance from April to July amounted to 18.7 million bushels, also the smallest in 5 years. Stocks were already low on April 1 this year with few beans for commercial sale still on farms. Most of the disappearance since then has been beans used for seeding the 1947 crop.

STOCKS ON FARMS

State	July 1 1946	July 1 1947	State	July 1 1946	July 1 1947
	1,000 Bu.			1,000 Bu.	
New York	8	13	Delaware	16	44
New Jersey	16	21	Maryland	40	29
Pennsylvania	34	34	Virginia	82	39
Ohio	582	813	West Virginia	1	1
Indiana	858	760	North Carolina	135	114
Illinois	3008	1876	South Carolina	8	13
Michigan	85	77	Georgia	1	2
Wisconsin	17	41	Kentucky	29	86
Minnesota	131	427	Tennessee	14	12
Iowa	1060	1049	Alabama	18	10
Missouri	468	574	Mississippi	40	42
North Dakota	7	7	Arkansas	50	82
South Dakota	4	11	Louisiana	16	12
Nebraska	14	10	Oklahoma	1	2
Kansas	59	65	United States	6802	6266

• SOYBEAN INSPECTIONS. Inspected receipts of soybeans have decreased steadily for the past 3 months, according to inspectors' reports to the grain branch of the Production and Marketing Administration. June receipts totaled 1,521 cars compared with 3,679

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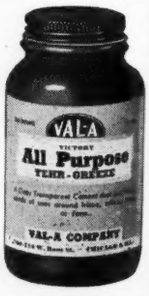

cars in May and 5,852 cars in April. The June average for the crop years 1940-45 was 2,893 cars. Inspected receipts October through June this season were 80,469 cars compared with 80,459 cars for the same period last year.

Of the June inspections only 60 percent graded No. 2 or better compared with 75 percent in May. Of the October-June receipts this year 70 percent graded No. 2 or better compared with 92 percent last season.

● COMMERCIAL SOYBEAN STOCKS. Production and Marketing Administration's commercial grain stock reports for the first four Tuesdays in July.

U. S. SOYBEANS IN STORE AND AFLOAT AT DOMESTIC MARKETS (1,000 bu.)

	July 1	July 8	July 15	July 22
Atlantic Coast	136	117	100	78
Gulf Coast	0	0	0	0
Northwestern and Upper Lake	278	177	175	168
Lower Lake	618	562	474	320
East Central	860	805	617	256
West Central, Southwestern & Western	367	294	259	245
Pacific Coast	0	0	0	0
Total current week	2259	1955	1625	1067
Total year ago	3424	2808	2266	2294

● SOYBEAN GLUE IN PLYWOOD. Soybean glue consumed by the softwood plywood industry in May totaled 1,943,000 pounds, reports Bureau of the Census. This compares with 2,090,000 pounds in April, and 2,007,000 pounds in May of 1946.

Phenolic resin glue used by the industry in May was 2,825,000 pounds; casein glue, 459,000 pounds. Total glue consumed in May was 5,451,000 pounds.

May glue stocks, in pounds: casein 408,000; soybean 1,091,000; phenolic resin 1,274,000; other 257,000.

EDITOR'S NOTE: Through error, the soybean glue report carried on this page in July listed glue in square feet. It should have been pounds. Is our face red

---

● STANDARD SHORTENING SHIPMENTS. Reported by members of Institute of Shortening Mfrs., in pounds.

July 5	3,818,448
July 12	4,516,634
July 19	5,132,571
July 26	5,658,964

Government Orders

● SOYBEAN OIL ALLOCATION. The United States Department of Agriculture announced that soybean oil will be allocated for export to olive oil producing countries in order to facilitate the movement of olive oil into the U. S. from those countries. This soybean oil will be licensed in accordance with the export procedures of the Department of Commerce in quantities not in excess of imports of olive oil into the U. S. for domestic consumption.

Olive oil has been in short supply in the U. S. for several years. At the present time certain Mediterranean countries have exportable surpluses of olive oil.

Domestic soybean oil, moving into the Mediterranean countries at a lower cost per pound than olive oil, would permit these olive oil producing countries to improve their dollar exchange for the purchase of other American products.

● PROTEIN FEEDS ALLOCATIONS. The U. S. Department of Agriculture announced export allocations of 15,000 long tons of oilseed cake and meal to Belgium (for shipment in the October-December 1947 quarter).

The Belgian allocation is to fulfill a commitment to supply oilseed cake and meal in exchange for palm oil.

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27th ANNUAL CONVENTION

AMERICAN SOYBEAN ASSOCIATION

ABOUT 500 people from 26 states, Canada and six foreign countries attended the 27th annual convention of the American Soybean Association which closed at Columbus, Ohio, September 6.

All segments of the industry, including growers, processors, grain and feed men, manufacturers, industrial and governmental research men came to attend the formal programs and discuss the present and future of the soybean crop—a future that never looked brighter than it does now.

Ersel Walley, Walley Agricultural Service, Fort Wayne, Ind., was elected president, succeeding Walter W. McLaughlin, McLaughlin Agricultural Service, Decatur, Ill. Mr. Walley has been actively interested in the Association for many years, and a member of its board of directors.

W. G. Weigle, Marsh Foundation Farms, Van Wert, Ohio, was elected vice president, succeeding J. B. Edmondson, Danville, Ind. Geo. M. Strayer, Strayer Seed Farms, Hudson, Iowa, was reelected secretary-treasurer.

All board members whose terms expired this year were reelected. They included: Jacob Hartz, Stuttgart, Ark.; Frank S. Garwood, Stonington, Ill.; J. B. Edmondson, Danville, Ind.; Ersel Walley, Fort Wayne, Ind.; Howard L. Roach, Plainfield, Iowa; John W. Evans, Montevideo, Minn.; and John Dries, Saukville, Wis.

The membership of the Association's board of directors was increased by one to 15, with the election of a director from Canada. He is R. H. Peck, River Canard, Ontario, who is also active in the Essex County Soybean Association. Mr. Peck's election is in recognition of increased Canadian interest in the soybean crop. Canada this year is raising her largest acreage and her biggest crop of soybeans.

Directors whose terms carry over are Walter W. McLaughlin, Decatur, Ill.; Geo. M. Strayer, Hudson, Iowa; Harry A. Plattner, Malta Bend, Mo.; L. S. Stoner, Holly Bluff, Miss.; G. G. McIlroy, Irwin, Ohio; and W. G. Weigle, Van Wert, Ohio.

Dr. Lewis C. Saboe, associate agronomist of the Bureau of Plant Industry at Columbus, was in charge of a well organized field day at Ohio State University's Sinclair and University Farms September 5. He was ably assisted by other members of the University's agronomy staff.

Demonstrations at the experimental farms included cultural weed control, methods of seeding, fertilizer applications on soybeans, date of planting and yield tests, recommended varieties and vegetable varieties.

Of special interest were experiments with flame weeding and artificial defoliation with cyanamid which are being carried on at the University.

Transportation to and from the farms was furnished by the Ohio Soybean Processors Association.

Convention attendants were guests of the Capital City Products Co. at a buffet luncheon Friday noon. This was followed by a tour of the firm's edible oil refinery and margarine plants. The Capital City people are manufactures of margarine, shortening, and salad oils employing soybean and other American oils.

Another feature of the convention was a paint demonstration house in Columbus provided by Fred J. Stark, one of the convention speakers and president of Sicca Soya Paint Co., Peoria. The house was partly painted, partly unpainted so visitors could observe the results obtained with one coat of a white paint employing soybean oil as a base. One room in the interior was finished with the Peoria firm's plastic plaster.

Two Illinois men and an Ohioan were elected honorary life members of the Association. They were J. C. Hackleman, extension agronomist of the University of Illinois at Urbana; I. C. Bradley, manager of the Allied Mills, Inc., processing plant at Taylorville, Ill.; and G. G. McIlroy, Irwin, Ohio.

Hackleman and McIlroy are both past presidents of the Association. Bradley was one of the nation's pioneer soybean processors.

The presentation of the awards was made at the annual convention banquet by J. B. Edmondson in behalf of the committee on

Listening to after-dinner speakers are some well known scybeaners. Left to right around the table, beginning at the extreme left: Mr. and Mrs. John W. Evans, Montevideo, Minn.; Mrs. and Mr. G. G. McIlroy, Irwin, Ohio; J. C. Hackleman, Urbana, Ill.; Mrs. and Mr. I. C. Bradley, Taylorville, Ill.; and Ersel Walley, president-elect, Ft. Wayne, Ind. McIlroy, Hackleman and Bradley were made life members.

awards. Other members of the committee were Dr. W. L. Burlison, head of the department of agronomy, University of Illinois, and J. W. Calland, director of economic research for Central Soya Co., Inc., Decatur, Ind.

A tribute to W. E. Riegel, Tolono, Ill., pioneer soybean grower and a past president of the Association, who died following the convention in St. Louis last year, was paid by Dr. W. J. Morse of the Bureau of Plant Industry, Washington, D. C.

SONG LEADER

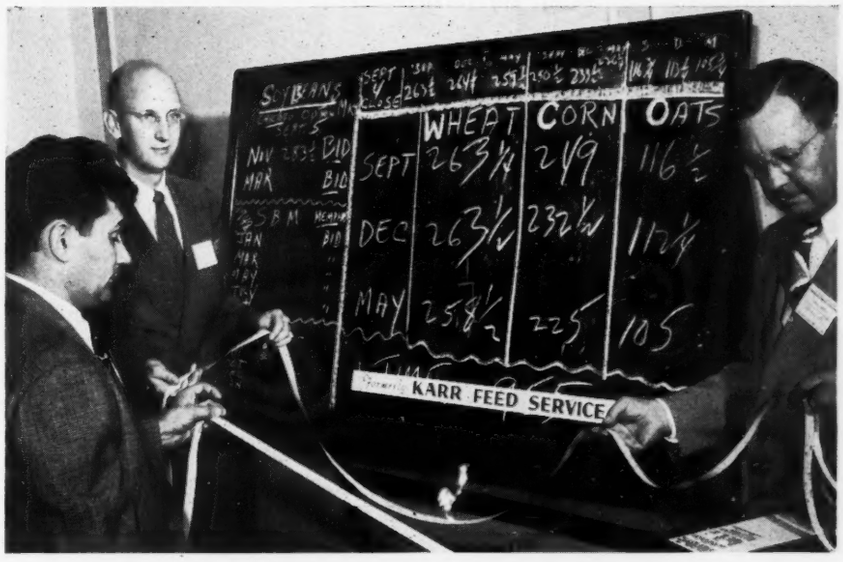
Joe Seabold made a highly popular song leader at convention sessions. Seabold, who is employed by Central Soya Co., Inc., in the sales division of the feed department in charge of northwest Ohio, has built a hobby of song leading. This takes him to many state and national conventions both in the U. S. and Canada. He was selected as national song leader for Kiwanis International in 1945. He spent 10 years in the show business on the east coast before joining the Central Soya Co.

Dr. F. X. Laubscher, senior research officer in charge of plant breeding, Union of South Africa, gave a short informal talk on soybeans in South Africa.

The informal smoker preceding the convention Wednesday evening developed into a price discussion which revealed considerable uncertainty about what will happen to farm markets. Men in the industry want some questions answered before they will make definite predictions. Some of these questions are:

Will the crop get ripe? Soybeans are late in maturity. An earlier-than-normal frost could damage them. They are not out of the woods yet.

Will farmers store more soybeans than



Of more than passing interest was the board of grain quotations in the Karr & Co. booth at the convention. You see examining the tape, left to right: William V. Karr of the Karr firm, Columbus; R. R. King, Mrs. Tuckers Foods, Sherman, Texas; and E. F. (Soybean) Johnson, Louisville Soy Products, Louisville, Ky. With corn at $2.49, this picture may appear a little strange 5 years from now.

The convention photographer, Mr. Ralph Ernst, was kept busy for 3 days catching the various activities of folks at the meetings. Here you see people in line at the Buffet luncheon which was provided by the Capital City Products Co. just before the trip via busses to the Capital City plants. Luncheon was served in the ballroom of the Deshler-Wallick Hotel.

Our foreign visitors received a welcoming hand at the annual banquet. Standing at left acknowledging his introduction is Jorma Suojanen, of the Finnish firm, Ateka. Below, left, you see Dr. and Mrs. Paiva Ramos of Brazil. Dr. Ramos is a specialist in children's diseases. Right, L. E. Manning, in charge of the Urbana Laboratories booth, center, visits with E. Riquier, French Supply Council, Washington, D. C., left, and Claud Maurel of the Agricultural and Industrial Society of Soya, who flew from Paris to attend the meetings.

Some members of the new ASA board of directors. Standing, left to right: R. H. Peck, River Canard, Ontario, only new member of the board; J. B. Edmondson, Danville, Ind.; Howard L. Roach, Plainfield, Iowa; John W. Evans, Montevideo, Minn.; John Dries, Saukville, Wis.; Frank S. Garwood, Stonington, Ill.; and President Ersel Walley, Fort Wayne, Ind. Seated: Secretary-Treasurer Geo. M. Strayer, Hudson, Iowa; Walter W. McLaughlin, Decatur, Ill.; G. G. McIlroy, Irwin, Ohio; Harry A. Plattner, Malta Bend, Mo.; and Vice President W. G. Weigle, Van Wert, Ohio. Not present were L. S. Stoner, Holly Bluff, Miss., and Jacob Hartz, Stuttgart, Ark.

they did last year? Or will they dump well over half the crop on the market in a 6-weeks period, as they did last year? This sort of dumping does not make for a good market. Some additional storage is being built and farmers are buying or leasing CCC steel bins.

What will happen to the price of lard and other fats? In recent months all fats have been dragged down in price. There is no sense in the present lard-corn price relationship, with lard at 17c a pound and corn $3.60 per hundred.

OIL MARKET

How will the market for oil meal hold up? If there is any liquidation of livestock numbers because of the short corn crop less oil meal will be fed. Packers say hogs are already going to market fed to shorter weights. But on the other hand, there may be a tendency to feed more protein to stretch the corn supply. Dairy cattle will be fed more roughage this year, it was predicted. This will call for more protein concentrates to balance the roughage.

The question of exports and European relief was certain to come up. The big question mark is still the international situation. Will the Marshall plan be adopted by Congress? If so, what farm products will be shipped abroad under it?

There is no question but that if the needs of hungry people all over the world can be translated into effective demand, we shouldn't have to worry about farm prices for the present. But can it?

CONVENTION BOOKLET

A well printed 20-page booklet, "Welcome to Ohio," was published and distributed at the convention by the Baltimore & Ohio Railroad, to "give a complete picture of all phases of soybean production, processing and utilization in Ohio."

The booklet pointed out that a progressive soybean development program was taking place through the efforts of the Ohio Agricultural Experiment Station, the College of Agriculture, Ohio State University, the agricultural extension service, American Soybean Association, the U. S. Department of Agriculture, the Ohio State Department of Agriculture and the Ohio Soybean Processors.

Contributors to the booklet were G. G. McIlroy; L. E. Thatcher, Ohio Agricultural Experiment Station; D. F. Beard, Ohio State University; and J. W. Calland, Central Soya Co., Inc.

Visitors from foreign countries in addition to five registrants from Canada included:

E. Riquier, French Supply Council, Washington, D. C.

Claude Maurel, National Institute of Soja, Paris, France, who flew from Paris to the convention.

Dr. and Mrs. Paiva Ramos, Brazil.

A. G. Stoon, Netherlands Embassy commercial adviser, Washington, D. C.

Jorma Suojanen, representing Ateka, of Finland.

F. X. Laubscher, College of Agriculture, Potschtroon, South Africa.

The 28 exhibit booths of firms serving the industry received many visitors during the convention. Exhibitors included:

Urbana Laboratories, Urbana, Ill.

Neff & Fry Co. Camden, Ohio.

Dixie Machinery Manufacturing Co., St. Louis, Mo.

Soybean Digest, Hudson, Iowa.

The Wolf Co., Chambersburg, Pa.

A. E. Staley Manufacturing Co., Decatur, Ill.

Anglo-American Mills Corp., Owensboro, Ky.

Signal Scale and Manufacturing Co., Louisville, Ky.

Blaw-Knox Co., Pittsburgh, Pa.

Safety Car Heating & Lighting Co., New Haven, Conn.

Baltimore & Ohio Railroad, Baltimore, Md.

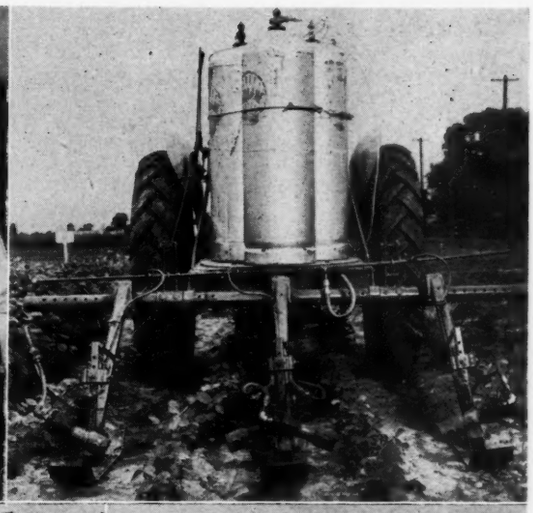
Gruendler Crusher & Pulverizer Co., St. Louis, Mo.

Hendrick Manufacturing Co., Carbondale, Pa.

Nickel Plate Road, Cleveland.

(Continued on page 65)

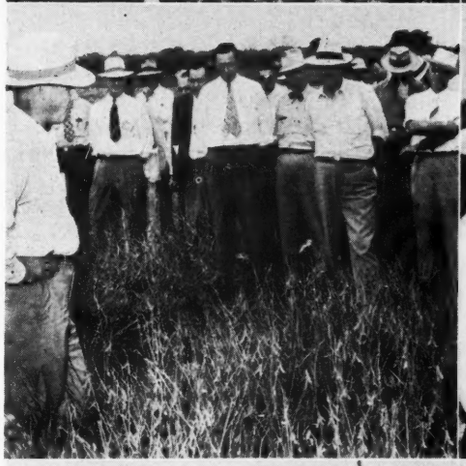
Field Day at Ohio State University



At right are some of the same people and scenes you saw if you were on the ASA convention field trip at Ohio State University farms September 4.

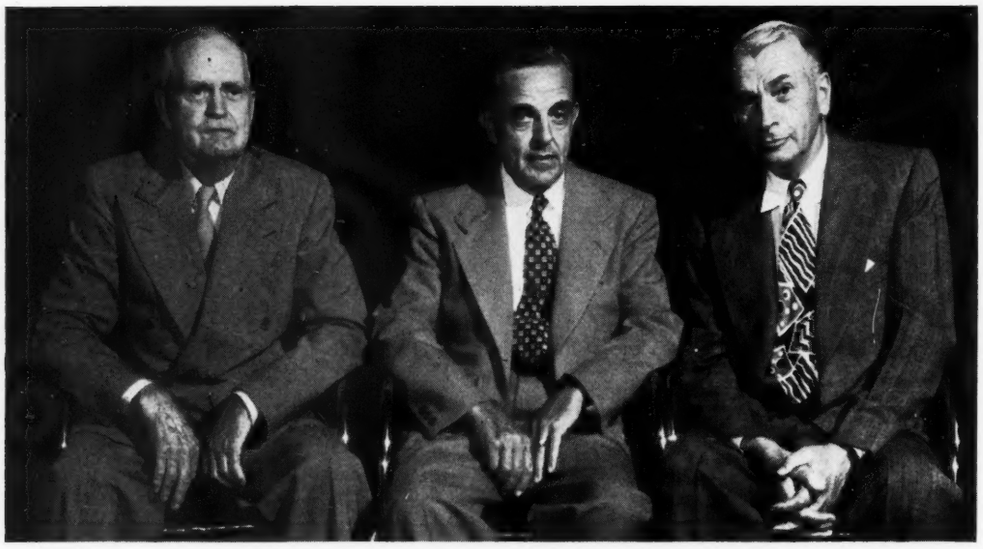
At top left, Howard L. Roach, Plainfield, Iowa, and Walter W. McLaughlin, Decatur, Ill., at one of the Sinclair farm test plots. What are they talking about? The price of corn? To the right, a flame weeder. The agronomy staff is testing it on soybeans.

In the next row at left, C. R. Weber, Bureau of Plant Industry at Iowa State College, Ames, and J. W. Calland, Central Soya Co., Inc., examine some rows of flame-weeded soybeans. At right, Geo. A. Argus, Julian Farms, Cincinnati, a familiar figure at ASA conventions, and Dr. Lewis Saboe, associate in agronomy at Ohio State University. Saboe was in charge of the superbly organized field day.



Just below at extreme left, Dr. L. T. Boyd of the American Cyanamid Co., Lafayette, Ind., discusses the artificial defoliation plots where cyanamid dust had been applied at rates of from 100 to 300 pounds per acre, with a convention group. At right, visiting at a Sinclair farm fertilizer plot: Dr. J. W. Hayward, director of nutritional research for Archer-Daniels-Midland Co., Minneapolis; R. G. Houghtlin, president of the National Soybean Processors Association; and Ashleigh P. Boles, manager of agricultural development, Missouri Pacific Railroad.

At bottom left, USDA and University agronomists discuss the new Hawkeye variety. They are, left to right: J. L. Cartter, U. S. Regional Soybean Laboratory, Urbana, Ill.; E. E. Hartwig, North Carolina State College, Raleigh; Dr. J. L. Allison, senior pathologist, Bureau of Plant Industry, Beltsville, Md.; Paul R. Henson, Delta Branch Experiment Station, Stoneville, Miss.; Dr. L. F. Williams, U. S. Regional Soybean Laboratory, Urbana, Ill.; and L. N. Skold, University of Tennessee, Knoxville. At extreme right, Dr. C. J. Willard, the University's weed expert, in a corn plot.



Left to right, I. C. Bradley, J. C. Hackleman, G. G. McIlroy.

HONORARY LIFE MEMBERS

I. C. Bradley, J. C. Hackleman and G. G. McIlroy were chosen honorary life members of the American Soybean Association at its 27th annual convention in Columbus Sept. 4-6.

The Association now has five life members. Dr. W. J. Morse, principal agronomist of the Bureau of Plant Industry, Beltsville, Md., and Dr. W. L. Burlison, head of the Department of Agronomy, University of Illinois, Urbana, Ill. were made life members in 1946.

Following were the presentation talks made by Vice President J. B. Edmondson, Danville, Ind., who was chairman of the awards committee:

I. C. Bradley

I. C. Bradley is a native son of Buchanan, Mich., where he obtained his elementary education.

After taking a 2-year course in liberal arts at Ann Arbor, Mich., he came to Illinois and entered the drug business.

In 1901, he graduated in the school of pharmacy at the University of Illinois. As rare good fortune would have it, he had a good friend engaged in a modest linseed processing business at Chicago Heights, and, renouncing his chosen profession, Mr. Bradley joined this friend in the processing business.

This was at a time when soybeans were just beginning to attract attention in Indiana and Illinois. Out of a clear sky, came delegations from both states to Mr. Bradley begging him to attempt the processing of soybeans, in order to meet a desperate need for an outlet for the crop.

The story of Mr. Bradley's acceptance of this challenge, of his pioneering efforts to meet this situation, the courage with which he undertook an undreamed of project, the heart-breaking disappointments when farmers who grew the beans refused to feed the meal to their livestock even when given to them, the refusal of industry at first to accept the oil on any terms; and the ultimate growth of the soybean processing industry to its present proportions, would comprise a saga in the annals of American agriculture unequalled in dramatic intensity and interest.

After his trail-blazing experience at Chicago Heights in soybean processing, he went to Bloomington, Ill., as manager of the Funk Bros. plant and at present is still on the firing line with the Allied Mills plant at Taylorville, Ill.

Jay Courtland Hackleman

Jay Courtland Hackleman was born on the 24th of June, 1888, in Rush County, Ind. He spent his youth as a typical Hoosier farm boy 3 miles southeast of Carthage, Ind., and graduated from high school at that place.

In 1910, Mr. Hackleman graduated from Purdue University, majoring in agronomy, in the school of agriculture.

Two years later, he was granted a degree of master of science by the University of Missouri in the realm of field crops and field pathology. He served on the staff of this institution for 9 years.

In September 1919 he came to the University of Illinois in charge of crops extension, which position he has held during the past 28 years.

From the beginning of his educational work, the possibilities of the new soybean crop claimed his interest and through the years his knowledge and interest in this crop has grown along with its own phenomenal expansion.

During this period, he has served on many committees of the American Soybean Association. He served as its president in 1935.

At present, he is a member of the committee on soybean nomenclature of the U. S. Department of Agriculture.

Tonight, the agricultural world recognizes in Mr. Hackleman an authority on the general subject of soybeans that can scarcely be surpassed in this good land of ours. The contribution he has made to his adopted state of Illinois and to the soybean industry can in no wise be estimated.

Glen C. McIlroy

Glen G. McIlroy is and has been a resident of Irwin, Ohio, all his life and today lives in the house in which he was born in 1884.

He was graduated from high school at Mechanicsburg, Ohio, after which he attended Ohio State University.

Returning to the home farm of 315 acres in 1908 he has continued to manage it until the present time.

In 1927, he received the distinction of master farmer of Ohio, and later served 2 years on the board whose duty it was to select other master farmers.

In 1931, he helped organize Farm Management, Inc., which organization is recognized today as one of the highly successful organizations of its kind in the central west.

(Continued on page 70)

WHAT'S AHEAD

for Soybeans?

From the ancient ways of the Orient there came to this country in the early 1800's the lowly soybean. Treated as a curiosity, it received little or no attention as a commercial crop possibility until the turn of the century. Then it was that pioneers like Morse, Piper, Williams, Burlison repeatedly called to the attention of the American farmer the possible value of the crop. Contributing to progress from that point were the plant introductions of Morse, the price guarantees of Staley, the pioneering of Bradley and Funk, the gospel-preaching of agronomists such as Hackleman, Wilkins, Wiggans, Park, Beeson.

Prior to 1924 there were not enough soybeans grown in the United States so that acreage figures were compiled. Twenty-three years later 60 percent of all protein meal produced in the United States came from soybeans, augmented by one-half of the edible oils of the nation coming from the same crop. Almost overnight, in terms of agricultural history, the soybean became the second most important cash grain crop of the great Midwest area of the United States. World War II clinched that progress, made the United States the world's largest soybean producer.

Soybeans have increased in popularity because they lend themselves to mechanical production methods in an era when labor costs are high; because they have been profitable as compared with other crops; because they work into balanced farm rotations; because they were sorely needed to supply edible oils in a war-time economy; and because they present fewer problems than competitive crops.

"WHAT'S AHEAD FOR SOYBEANS?" will be determined by the extent of continued demands for food and feeding and industry in this country, and upon demands from outside the United States, tempered with ability to pay. The farmer will produce soybeans so long as they are profitable. Whether or not they are profitable is determined by the markets for oil and meal.

The papers presented on following pages represent the thinking of active leadership in research and industry on the course of the soybean industry during the period just ahead. They are symbolic of the type of advanced leadership existent in the industry; and are presented for your consideration.

What Does MARGARINE Mean to Producers of Soybeans?

More Than 75% of Soybeans Produced in IOWA . . .

Yes, during the twelve month period ending June 30, 1947, Soybean Oil used in making Margarine in the United States exceeded the quantity of oil that was produced from three-fourths of the Soybeans grown in the State of Iowa, and Iowa is the second largest producer of Soybeans. Just visualize 10,000 fields, each containing 125 acres of Soybeans. This tremendous quantity of beans was used in the twelve month period in the making of Margarine!

Margarine is a dependable outlet for Oil produced from Soybeans. The expanding use of Soybean Oil in Margarine has helped create a wider market for Soybeans and has substantially increased the income of the Soybean producer.

The oil used in making MEADOLAKE Margarine has always come exclusively from selected vegetable oils produced on our own American farms. Its goodness is proved by the constantly increasing consumption by the American housewife of this high quality table spread, which has such a uniformly delightful flavor. To assure maximum nutritional value, every pound of MEADOLAKE Margarine is fortified with 15,000 units of Vitamin A.

You, too, will enjoy MEADOLAKE Margarine.

Mrs. Tucker's Foods, INC. SHERMAN, TEXAS

WHAT'S AHEAD FOR SOYBEANS?

By O. K. QUIVEY

A FAT little immigrant came to America about 1804 and for approximately 100 years lived in obscurity until she finally met her Prince Charming—research—and became the Cinderella of American agriculture.

Reference, of course, is made to the soybean. In the entire colorful and illuminating story of American agriculture there is nothing more spectacular than the astonishing rise to stellar position attained by the soybean.

But what's ahead for soybeans will be largely determined by the degree of success with which we solve some of the industry's technological problems, the existence of which is familiar to us all.

Certainly, therefore, I shall not attempt to pull any rabbits from the hat, but rather I shall attempt to review, organize and summarize those problems of the industry in the hope that, by so doing, each worker in the industry—grower, researcher, specialist or processor—may be helped to better meet his responsibilities and to make the most constructive contribution possible to what *IS* ahead for soybeans.

This year's crop is estimated at 200 million bushels, the largest ever, and a peacetime crop at that. This observation in no sense minimizes the magnificent contribution the soybean made during the war years. Yes, we can all well shudder to think what would have happened without soybean's two products—oil and meal —to the war feed and foods programs.

SOYBEAN LEADS EDIBLE OILS

In the production of edible oil, the soybean now leads the field—ahead of the great cottonseed oil output. Soybean oil meal as a superior protein ingredient for livestock and poultry feeds now *commands* a place we *dreamed* of only a few years ago. Soy protein has forged its way, and rightfully so, into the human food field with the production volume mounting annually. Its value as a human food has only been dimly realized as compared with the position it is destined to attain. And all this preeminence was made possible because a few stout-hearted scientists dared to look beyond what was "printed in the book."

"The wise know much—they know what not to try,
They know the pitfalls where the dangers lie.
But past the wise the dreamers dare to go,
Tomorrow is the land they wish to know.
Not from the wise—but from the daring mind
Comes progress, since the wise men stay behind,
While some brave doubter o'er the barrier looks
And finds a truth—not printed in the books!"

It will be my purpose to attempt to point out those factors and forces which I believe will have a bearing on the future competitive position of the crop, the consideration of which should be helpful in visualizing what's ahead for soybeans.

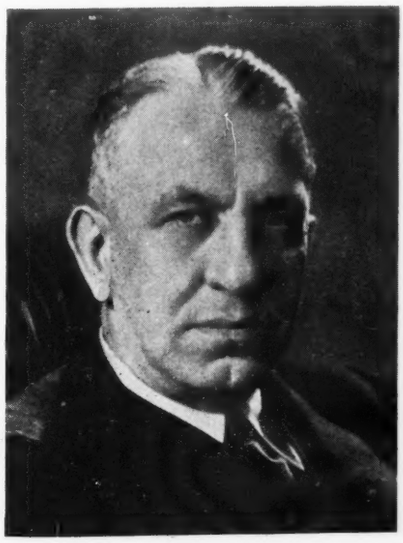
To begin with, I am disturbed by the smug complacency with which we stand by to view our progress to date. There is no such thing as standing still, "marking time," so to speak, for those who try it only awaken to find that the parade has gone by. Progress, "onward march," must continue to be the order of the day, and *research* must be our broad highway. Dividends are large on every dollar invested in agricultural research; over-all returns probably average 500 percent, though a return of 10,000 percent on the investment in research is not unusual. For example, it cost the Bureau of Animal Industry about $1,500,000 to eradicate contagious pleuropneumonia from this country when, before 1844, it was wiping out our cattle industry. The result has been a saving to our cattle growers of 41 million dollars in their exports to Great Britian alone.

It cost $65,000 to make discoveries which enabled the Bureau of Animal Industry to fight successfully the cattle-tick fever, a discovery which has been worth 40 million dollars a year every year since to this country.

And no greater vindication of research in the fields of science ever surpassed the production record of the agricultural industry during World War II when, with labor, supplies, insecticides, fertilizer and equipment all scarce, sufficient additional food was produced, as compared with the 1935-39 period, to feed 50 million additional persons. It has been shown that with certain adjustments of our farm production and dietary patterns we could readily produce enough food, using our newer agricultural technology to its highest potentialities, to provide for a population twice the size of that we now have.

Far be it from me to imply that there has been anything lacking or wrong with our soybean research in the past. My point is that it must continue unabated for both grower and processor alike in its fundamental, applied and development phases.

O. K. QUIVEY



Since the factors influencing the future of the soybean fall into three categories, let us consider them as such — agronomic, industrial and market demands.

AGRONOMIC STANDPOINT:

Soybeans in the future, as before and during the war, will have to compete with other crops for the use of the farmers' land, depending on the relative per-acre net returns that can be obtained from soys versus other crops.

While the returns per unit for all crops will depend on costs and prices, yet the deciding factor with the individual farmer should be the combination of crops and livestock enterprises that he believes will bring in the largest net return from his whole farm operation.

The soybean needs no defense, but we, her friends, need to see that she does not continue to be maligned as the "ally of erosion." It is not the soybean crop that causes erosion, but, rather, some of the men growing it and the system and practices they employ. Soybeans are no more responsible for erosion than is corn or any other grain crop handled in a similar manner.

The place that the soybean occurs in the rotation influences the amount of erosion that occurs. Soybeans usually follow corn. If we are to get a true picture of soybeans as an erosion hazard it should be in comparison with second-year corn. Soil tilth deteriorates rapidly after meadows are plowed to an intertilled crop. Much of it is gone by the end of the corn year, which of course accounts for erosion increases on second-year corn. As was so well stated by Dr. G. N. Browning in his article in the June *Soybean Digest*, "we can expect more erosion from soybeans following corn than from first-year corn following a meadow crop, which accounts largely for the common opinion that soybeans cause more erosion than corn."

Soybeans are not only adapted to crop rotations in the Cornbelt but are especially logical where corn borer control is a consideration, as in the eastern Cornbelt, with the infestation spreading westward. Soybeans have their place. They should be used in a soil-conserving rotation in contrast to the practice that has been entirely too prevalent in some areas of growing beans year after year on the same ground because of the currently higher return per acre as compared with other crops. While price supports for soybeans are likely to be lowered or withdrawn, *good* farm practice will allocate the soybean to its rightful place in the farm picture. Much of our interpretation of the importance of any crop, soybeans or otherwise, has been evaluated with improper emphasis on the part that crop plays in a complete farming pattern.

NOT JUST A WAR CROP

Further, we must defeat the idea that soybeans were a wartime crop and that they will become much, much less important in peacetime. Let it be stated again

and again that soybeans prior to the war had established themselves as a permanent part of our system of agriculture where soil and climate conditions make it practicable to grow them. The peak was reached in 1942—since maintained at the '43 level until this year, when we shall apparently reach a new all-time high.

More recognition must be given by growers to the importance of varietal adaptation as an important factor contributing to economic production. Much progress has been made, but more is both needed and possible in the elimination of low-oil-content varieties and the breeding of more oil-rich varieties.

Plant only the highest-yielding varieties of high-germinating seed in properly prepared seedbeds, with weeds controlled by cultivating the growing crop whether planted solid or in rows. Agronomic research developed the varieties Lincoln and Earlyana. The Lincoln, adapted to an area that produces more than half of all the commercial soybeans grown in the United States, in tests over a period of 6 years throughout the area, averaged 20 percent higher yields than the average of present standard varieties.

CONTRIBUTION OF PATHOLOGISTS

Soybean production in the future may be expected to be more stable, due to the large number of pathologists studying soybean diseases which may affect yields from year to year.

Not many serious soybean diseases are known, but it can be expected they will increase as soybean production continues. If these can be studied as soon as they appear, with control measures worked out before the diseases become very serious, uniform soybean production can be more reasonably expected.

Control measures may be chemicals, cultural practices or resistant varieties. The resistant varieties must come from the plant breeders working in cooperation with the growers. Up to the present, soybean plant breeders, in general, have not given much consideration to disease in their improvement program, principally because very little is known about soybean diseases.

In the years ahead, a great deal of the soybean breeder's time will be devoted to breeding for disease resistance. It is reasonable to expect that the newer varieties, in addition to being disease resistant, will also increase the yields greatly. *It is entirely possible that varieties will be developed within the next few years that will increase the yield from 10 to 20 percent over the best varieties now available.* Further, a great deal of time and energy is being devoted to the study of various nutritional phases of the soybean plant.

If these studies provide us with information on soybean nutrition, it will make it possible for us to use complete fertilizers. Yields will probably be increased greatly over the percentage given above. Since soybeans do not react directly to fertilization, yields at present are dependent on the yielding factors in the strains themselves and the high fertility levels of the fields. Is it not reasonable to expect that, with the development of varieties resistant to plant diseases and responsive to commercial fertilizer, present average yields may be raised 10 to 15 percent?

Present inadequate farm storage of beans should receive prompt and thorough consideration of growers. Not only is it

Processor Capacity and Efficiency Must Be Matched by Producer Capacity and Efficiency if the Industry Is to Grow and Prosper, Says the Author. He Is Manager of Agricultural Development for the B & O Railroad.

impossible for the railroads to provide a car supply adequate to move the crop in a 3- to 4-weeks' period, but no system of marketing wherein the major portion of the crop is dumped on the market in such a short period will ever yield maximum returns to the grower.

One of the problems of the processor is to have a bean supply available to keep his plant in operation throughout the year. No plant can be most economically managed if operating at capacity for 6 months and practically idle for a like period.

The answer is more adequate farm storage for soybeans that will make possible more orderly marketing by spreading it over a period of several months in place of the present hectic annual dumping of the crop immediately after it is harvested.

According to a study made by Dr. L. J. Norton, marketing specialist, University of Illinois, from 1938 to 1942, the year price ceilings were established, farmers averaged 18 cents a bushel more by holding their beans until June, and, according to Dr. Norton, soybeans have been the most profitable major Midwestern farm crop to store for higher markets.

Average prices received for soybeans by all farmers in the United States indicate that over a 20-year period November averaged lowest, at $1.26 per bushel, while May averaged highest, at $1.60 per bushel.

For 6 years during this 20-year period bean prices were lowest in November, for 5 years they were lowest in October and for 4 years soys brought the lowest price in September.

It is significant that the average prices received by farmers for their beans were highest in May, June and July for 14 of the 20 years in question.

ALREADY HAVE STORAGE SPACE

Our farmers have space in which they can store a goodly share of their 1947 crop. If you, Mr. Grower, have not provided adequate storage space for beans this fall, survey your available facilities—sheds, empty rooms, barns, bins, stalls, empty hog and brooder houses—and remedy this situation at least in part. Of course, permanent storage is preferable and many farmers are building or planning large granaries with overhead bin space.

It is believed that if growers in future years realize maximum return on their beans they must realize their own responsibility in this respect and help develop a more orderly system of marketing in answer to the steady year-round demand. This they can do by selling a portion of their crop at harvest-time for needed cash and holding the remainder for sale later when prices are usually higher.

The facts that soybeans do well on soils not too acid for other crops, are more resistant than corn to drought, are still relatively free from insect and disease damage and are an advantageous crop from the standpoint of the distribution of labor during the cropping season all indicate their growing popularity and place in the farm picture.

PROCESSOR STANDPOINT:

Soybean processors, generally, are keenly aware of the extremely competitive situation that is certain to materialize in the industry in the years ahead.

During the war, capacity for processing was not only increased but efficiency of processing was also increased, with the result that the industry had a processing capacity in excess of its production.

The competitive position of individual plants will of course be affected by such factors as location, freight rates, market connections and financial reserves, as well as by efficiency of operation. Many processors are making certain adjustments aimed at strengthening their positions; for example, conversion to solvent type of extraction. Eventually, it will be the survival of the fittest, the least economical plants eliminating themselves from the picture.

Soybean oil has both desirable and undesirable qualities. It is a "must" of the industry, through research, to retain the desirable and eliminate the undesirable qualities. For example, in the making of paint the oil is more or less immune to the objectionable yellowing quality associated with interior linseed oil finishes, and research has indicated that a new chemical treatment reduces the drying time of the oil without affecting its other qualities; this process has been made available to the processor.

Research by private concerns continues, as well as by the Northern Regional Research Laboratory and the U. S. Regional Soybean Laboratory, to develop more efficient techniques for processing and methods for improving the quality of oil and meal as well as adapting them to new specific uses. In the years ahead this will certainly lead to reduced cost of processing and expand the markets for soybean products.

Official market grades do not give consideration to oil content, a very important factor to processors since a difference of 1 percent in oil makes a large difference in the processing margin. Since the Commodity Credit Corporation considered oil content in establishing prices at which soybeans were resold under government contract during the war to the processors, it is to be expected that official market grades for soybeans in the years ahead will include the oil content factor in addition to moisture, test weight, color, dockage and foreign material. This not only would reduce one element of risk to the processors but would at the same time be reflected to growers in the form of relatively higher prices for soybeans of relatively higher oil content.

MARKET DEMANDS STANDPOINT:

Soybean oil meal for feed continues to find an expanding market. More livestock producers than ever before are feeding

Don Scott field at Ohio State University.

soybean meal and indicate that they will use it extensively in the future.

Mixers of commercial feed during the war used larger quantities of soybean oil meal to supplement the relatively short supplies of animal protein. Because of its advantages in uniformity of composition, keeping quality and relative cost, they are likely to use it extensively in the years ahead. Of course, as the animal-protein feeds are mostly by-products, they will be marketed and used to the extent that they become available in connection with the production of the main products with which they are associated. Soybean oil meal, however, will be readily accepted as a supplement or extender of the animal proteins. It has been demonstrated that when soybean oil meal is used as a protein supplement for hogs and poultry a smaller percentage of such animal proteins as tankage, meat scraps and fish meal is needed than was formerly believed necessary for economical growth.

The expanded mixed-feed industry and the increase in popularity of commercial feeds will also promote the use of larger quantities of high-protein concentrates.

Increasing quantities of soybean oil meal are likely to be used for industrial purposes in the years ahead. Such uses were retarded by government restrictions and curtailment of certain manufacturing activities during the war. One of the most promising of these is the manufacture of water-resistant plywood glue which may be greatly increased with the increase in construction of prefabricated houses.

GLUE IN AUTO INDUSTRY

Considerable quantities were used in the various phases of the automobile-manufacturing industry before the war, and this may be resumed, although there are some indications that less expensive materials may form a more important source of plastics in this particular industry.

If the process of manufacturing soybean wool is perfected, this use would absorb large quantities of soybean oil meal. Whether soybean wool can be produced cheaply enough to compete with other fibers still remains uncertain, but research workers are enthusiastic about the possibilities of soybean protein for industrial uses.

Methods of manufacturing soya flour of improved quality have been developed, and research aimed at further improvement in the palatibility of soya flour and soya protein for food enrichment is being carried on by processors as well as in state and federal laboratories.

While industrial and food uses of soybean oil meal may be greatly increased, its principal use is likely to continue to be in livestock feeding, for its future in the feed market seems bright.

The utilization of soybean oil by industry is in its infancy. The capacity of industry to consume soybean oil is limited only by the divers uses which can be thought up for it.

SOYBEAN OIL IN PAINT

As stated by Francis Scofield of the National Paint, Varnish and Lacquer Association at the Soybean Conference at Peoria last February, it is as certain as anything can be that the paint and varnish industry, within the next year or two, will be selling more than a billion dollars' worth of its products, with every dollar's worth of sales using a pound of oil.

Technical improvements in refining, bleaching and hydrogenation of soybean oil have enabled manufacturers to overcome undesirable features to a considerable degree. Soybean oil is now used in the same food products as cottonseed oil and with equally good results. Continued improvements of soybean oil for food uses may be expected in the years ahead.

Chemical research has proved the adaptability of soybean oil in the production of a wide variety of industrial products such as resins, coatings and artificial rubber, and its use for some of them, it is believed, will become important.

The general trend in per capita consumption of fats and oils in the United States has been upward for several years, and this, together with the increase in population, would indicate a total domestic consumption in the 1950's considerably above that of the prewar period. After all, the factor that will affect the soybean's economic status most will be the level of economic activity and employment in the nation.

Certainly for the next 4 or 5 years the world's fats supply will continue below normal. Further European livestock products will continue relatively low, making a strong demand for soybeans and meal which in a large part will be supplied by the United States.

This will likely be followed by a transitional period of another 4 or 5 years during which the fats and protein meals *supply* will be in better balance with demands, and soybean prices will fall below the present high levels, but above prewar.

Finally, within 10 or 15 years, supplies of oils and fats may become excessive if the probable expansion in plantation palm and other oil crops materializes. Prices of soybeans in that period would be somewhat depressed, yet it is highly probable that large-scale production of soybeans in the United States is here to stay.

The production and utilization of soybeans have increased 500 percent in 20 years. The soybean industry is now entrenched so firmly in our agricultural and industrial economy and so thoroughly mechanized in all parts of the industry that it appears safe from destructive competition.

Research is developing new and improved varieties, seeking to improve methods and machinery in the production of soybeans with a view to increased yields. This contribution of research to the production, processing and utilization of soybeans is excellent insurance to growers for the maintenance and expansion of their markets in the years ahead.

CONCLUSION:

By way of summarizing:

Industrially, the soybean has been publicized and credited with properties it does not possess, while, agronomically, it has been tagged with the stigma that it will ruin the ground, that it is the ally of erosion and a half-dozen other false and damaging statements.

It is time that the friends of the soybean, instead of its unsolicited publicists, proclaim the truth and cleanse the public mind of the false notion that the soybean is ruinous to agricultural progress and stability.

It is apparent that the processor not only desires year-round operation but believes there is a market for all that his plant, operating at capacity, will produce. However, he can process no more beans than are raised, and total processor capacity is in excess of production. The processing phase of the industry is characterized by a high degree of efficiency.

Processing capacity and efficiency must, to a greater degree than at present exists, be matched by producer capacity and efficiency if the industry as a whole grows and prospers to the advantage of all those participating in its benefits.

It would be a short-sighted policy for the grower to determine each spring what his soybean acreage will be on the basis of the current or anticipated price per bushel. Fortunately, not too many of our growers follow that policy. The wiser policy is one that allocates an annual acreage to soybeans as part of a systematic rotation and considers the crop as an essential part of the farm plan. It will, like such other farm practices as cattle feeding, production of market lambs or hogs, make more money some years and make

less in others, but over a period of years it will have its place, make a satisfactory profit to the grower and, as I have said, be considered by him as an essential part of his whole farm operation.

Now, this policy once determined, the grower can by the acceptance and employment of certain recommended practices, increase his efficiency and his yield by 6 or more bushels per acre. These have to do, of course, with seedbed preparation and seeding, method and time of planting, variety planted, cultivation and weed control, rotation and fertility practices. Most growers observe one or more of these practices—some observe them all, and religiously.

What the industry needs is full employment of these proven practices, together with adequate farm storage, on the part of all soybean growers.

Like the Ten Commandments, these practices need to be voiced again and again. The *Soybean Digest* could very appropriately issue "The Soybean Grower's Creed," listing the practices of the master soybean husbandman. A few converts each year would get more converts next year, and in a short span of years our grower efficiency could become one of the outstanding achievements of American agriculture.

The soybean, with its abundant amount of protein, vitamins and minerals, will be one of the most valuable protective foods in restoring a malnourished world. Its importance in meeting our postwar needs cannot be over-emphasized, and in the future the soybean as a fortifying food will play a still more important role.

Thus to the soybean falls the major role in maintaining an adequate protein and edible oil supply for the nation in the years ahead, not to mention industrial uses other than feeds and foods.

Crushing capacity in excess of the bean supply will mean strong bidding for soybeans, with the full year's crush going to those who can pay the most for the beans by reason of getting the most for their products and maintaining the lowest production costs in their respective plants.

Thus the ancient soybean, predating the pyramids and hoary with age before Solomon fashioned his temple, now the prodigy of American agriculture, and which played so vital a role in the late drama of Conflict, has the ability to star in the same role in the great drama of Peace. She needs what every star needs—a great supporting cast in which each of us has our particular responsibilities and role to play.

Soybean Oil in the Food Industry

By B. F. DAUBERT

Department of Chemistry, University of Pittsburgh

THE RECENT World War emergency has served to focus attention on the important role of fats and oils in the economy of the American people. Developments during the past 10 years, particularly in fundamental research, have been a reflection of the widespread interest in problems singularly peculiar to these natural products. Each year enormous quantities of fats and oils enter commercial channels.

In the 1944-45 crop year in the United States, more than 11 billion pounds of animal and vegetable fats, in about equal proportions, were produced from domestic sources. More than half of this total production was used for human food consumption and the remaining amount was used for a variety of non-food uses, for example, in soaps, paints, varnishes, and a host of other miscellaneous industrial products.

Assuming a good national income and a high rate of industrial activity, the demand for fats and oils in the next several years probably will be great enough to support an annual production of about 11 billion pounds. Although production of fats and oils decreased to a little less than 10 billion pounds in 1946, the production of soybean oil has increased to approximately 1½ billion pounds. These production and utilization statistics are impressive, but we possess only fragmentary knowledge of the products themselves, particularly of soybean oil and its well-known tendency to develop reverted odors and flavors.

Perhaps one of the largest users of soybean oil for food purposes is the margarine industry. Civilian use of margarine in 1945 was the largest on record, at 524 million pounds, of a total output of 613 million pounds. Forty-one percent of all the fats used in margarine was soybean oil. On the assumption that other oils will be used in greater quantity, competent opinion seems to indicate that the future use of soybean oil in margarine is predicated to a large degree on the solution of the reversion problem.

All natural fats and oils undergo oxidative deterioration, the extent of which is dependent upon the nature and amount of their unsaturated and anti-oxygenic components. If the oxidative process is allowed to proceed unchecked, organoleptic rancidity supervenes and thereafter the fat becomes relatively useless as a foodstuff.

Flavor reversion, another spontaneous and often deleterious change common to many animal, marine, and vegetable fats (1,2) is characterized by the appearance in refined oils of objectionable flavors and odors, prior to the onset of true rancidity. The term "flavor reversion" probably owes its origin to the early observation that aged bland marine oils develop a flavor and odor reminiscent of the unrefined oil. According to present usage, the term is applied to the presence of any undesirable flavor which may or may not resemble that of the unrefined oil.

Reversion and rancidification are concurrent processes, but their interrelationship, if any exists, is unknown. Each oil has its own characteristic reversion flavor and odor, whereas the "off" odors and flavors of rancidity are common to all fats.

ONLY SERIOUS SHORTCOMING

Reverted flavors and odors in oils such as cottonseed appear after long storage and therefore constitute no special problem for the food handler. However, a well-processed and bland soybean oil may revert in only a few days at moderate temperature. This lack of flavor stability is the only serious shortcoming of soybean oil; in all other respects, it is a highly desirable dietary fat. It is rich in natural antioxidants and possesses excellent keeping qualities, good consistency behavior, and low bleaching costs. For these reasons, its annual production has shown a steady gain since 1934. Added impetus in its production resulted from the wartime shortage of edible fats, and in 1944 its production soared to that of cottonseed oil (3). The problem of its flavor instability, however, has not been entirely solved, and the solution remains of paramount importance to the oil processor and manufacturer of edible fat products who serve a public accustomed to bland and flavor-stable oils.

The organoleptic test is the only current means of recognizing and evaluating reversion. A subjective method which depends upon personal judgment of flavor and odor by a taste panel is undesirable from a scientific viewpoint, yet in capable hands it gives valuable qualitative information concerning the state of reversion in an oil. The extent to which the organoleptic technique can be refined is amply illustrated by the elaborate taste panel of the Northern Regional Research Laboratory of the United States Department of Agriculture (4).

The course of reversion in soybean oil is indicated by the appearance of "grassy," "haylike," and "beany" flavors which increase in intensity and give rise to the "fishy" and "painty" flavors of badly reverted oil (4). Methods for the accentuation of reversion flavors include the heat test, in which the oil is heated to 200° C. for varying periods; the oven test, which comprises storage at 60° C.; exposure to natural or artificial light (5); and exposure to visible and infrared radiation (6).

The reverted flavors of hydrogenated and unhydrogenated soybean oil are not entirely similar. It is difficult to assess the shades of difference because the descriptive terms applied to the reverted flavor vary from individual to individual. Unfortunately, foods containing soybean oil may acquire its unpalatable reverted flavor. Slightly reverted oil may not be recognized directly in the foodstuff, but leaves a persistent and disagreeable aftertaste.

PROCESSORS KNOW PROBLEM

The average consumer may not be familiar with these effects of soybean oil in cookery, but the large food processors are well acquainted with the reversion phenomenon. Of serious concern to the industry is the flavor instability of hy-

drogenated soybean oil—a constituent of most shortenings. Hydrogenated oil reverts quite readily under many conditions, such as exposure to bright light or high temperatures. Doughnuts, potato chips, or similar foods made by deep-fat frying or other means requiring strong heating of the oil acquire the unpleasant fishy or painty flavors and aftertaste associated with reversion. Eggs have such a strong affinity for these flavors that the taste of an egg fried in soybean oil is often employed as a test for reversion.

The cause of flavor reversion in soybean oil is unknown. Since reversion has been observed in many oils, there is a tendency to seek a common explanation of the condition. However, our present knowledge of the process is too limited to allow general conclusions to be drawn. Although the hypotheses that have been advanced to explain the development of objectionable flavors and odors in fats are adequately reviewed elsewhere, it is perhaps desirable to mention them briefly in this discussion (1,2).

Among the various possibilities, linolenic acid is cited most frequently as the causative agent of reversion in unhardened soybean oil. This suggestion is supported by the fact that oils which revert easily, such as soybean, linseed, and marine oils, contain linolenic or more highly unsaturated acids, whereas the flavor-stable oils do not contain these acids in appreciable amounts. Iso-linoleic acid, a preferential reduction product of linolenic acid, is ascribed a similar role in simulated soybean and linseed oil (7). However, the contribution to the reversion process of iso-linoleic acids is far from completely understood and although they may be partly or wholly responsible for the reverted flavor in hydrogenated oils, an explanation for the condition in unhardened oils still remains to be determined. Evidence has also been presented recently to show that unsaponifiable matter present in the oil is a factor in the development of reverted flavor. The suggestion that cephalin, which is difficultly saponifiable, may be a precursor of reversion has also been suggested (8). On the basis of conflicting evidence, it may readily be seen that until the factors contributing to reversion are definitely identified it will be relatively difficult to prescribe methods for its control in the refined oil.

Recent work (6) has been directed toward isolation and identification both of the substances giving the reversion flavors and odors and the flavorless procursors of these "reversion" compounds. It is doubtful if the quantity of these compounds in a reverted oil exceeds a few parts per million (9); nevertheless, it is possible to concentrate them a thousandfold merely by deodorizing a heat-reverted oil and trapping the entire condensate.

REVERSION CAUSED BY TRACE MATERIALS?

Chemical examination of concentrates of reversion compounds obtained both from unhardened and hardened soybean oil shows the presence of carbonyl functional groups (6). When such concentrates are treated with the carbonyl reagents, sodium bisulfite, semicarbazide and trimethylacethydrazide on ammonium chloride (Girard reagent T), the reversion odors and flavors diminish or disappear entirely (10). In some instances, the flavor-producing reversion compounds can be regenerated.

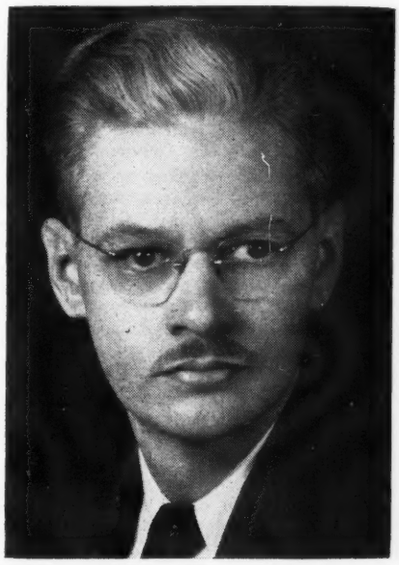
The Reversion Problem Must be Solved if Soybean Oil is to Maintain its Present Leading Position in the Food Industry, Says the Author. He is Director of Research Projects in Fats and Oils at the University of Pittsburgh.

Although the reversion compounds appear to be trace materials, their precursors in soybean oil are present in much greater quantity. The precursors can be removed in part by chromatographic adsorption of the petroleum-ether solution of soybean oil on activated alumina. Concentrates of the reversion precursors obtained by elution of the adsorption columns markedly decrease the flavor stability of the chromatographed oil.

Another approach to the problem has been the study of the flavor characteristics of a simulated soybean oil prepared by highly purified fatty acids of sources other than soybean oil (9,11). The flavors which appear in these oils upon exposure to intense light and heat do not resemble those of reverted soybean oil. Hence, it appears on the basis of this work that linolenic acid alone is not entirely responsible for reversion, if it is at all responsible.

Much can be done to improve the flavor quality of soybean oil products by minimizing such factors as the presence of light, heat, oxygen, and metals which accelerate reversion. By storage in darkness at low temperatures, reversion can be delayed for a considerable period of time. The freshly-refined oil may revert in a few days in diffuse daylight at room temperature and in only a few hours after exposure to light of higher intensity at 50° C (1). Strong daylight can have a deleterious effect on hydrogenated products stored at ordinary temperatures. Off-odors and flavors different from rancidity have been noted in shortenings after a few weeks exposure to bright daylight (14).

DR. B. F. DAUBERT



The portion of the visible spectrum between 325 and 460 mu appears to be largely responsible for such changes (5).

Copper is said to accelerate reversion. Definite information on the promoting effects of different metals is lacking. However, the pro-oxidant effect of certain metals upon vegetable fats and oils is well known (14) and any catalyst of autoxidation may also hasten the development of reversion.

The precise role of oxygen in the reversion process is obscure. Unlike autoxidation, reversion cannot be retarded by antioxidants, because the oxygen requirement of reversion is very small. Thus, flavor deterioration has been observed in soybean oil aged under inert gasses (9,13) and high vacuum (1). Intramolecular oxidation has been suggested as the explanation for reversion under such circumstances. The reverted flavor of soybean oil aged under nitrogen is more disagreeable than that of the oil stored in air (13). This observation may have practical significance because many edible oil products are packaged under anaerobic conditions.

QUALITY AND VARIETY ARE IMPORTANT

Both the quality and variety of the soybean are important factors in producing the best grades of soybean oil. Field damage to mature soybeans by frost or weathering detracts from the flavor quality of the refined oil (3). Poor farming practices, allowing the entrance of weeds and other foreign matter during harvesting, have a similarly deleterious effect. The highest quality of oil is obtained only from clean, sound, fully-matured soybeans of the yellow varieties (3).

Abusive treatment anywhere in processing, such as during milling, alkali-refining, bleaching, hydrogenation, and deodorization, adversely affects the flavor stability of the oil. Excessive refining, hydrogenation, or deodorization temperatures and excessive amounts of bleaching agent or alkali are also harmful. Solvent extraction, hydraulic pressing, and expeller milling are the methods usually employed for oil recovery. Of these, solvent extraction gives the best product. In hydraulic pressing of soybeans, the moisture content of the beans must be kept below 12 percent for best results (15).

There is general agreement that hydrogenation to iodine values of 50 or lower diminishes the tendency toward reversion. Unfortunately, an oil hardened to this extent is unsatisfactory for edible purposes unless it is blended with a liquid fat. In the manufacture of shortenings and margarines, soybean oil is usually blended with flavor-stable oils, such as cottonseed, prior to hydrogenation. If the proportion of soybean oil is maintained below a certain critical level, usually 25 to 35 percent, detectable reversion usually does not occur (2). This method for masking the reversion reaction has been widely used in industry, particularly for manufacture of the highest quality brands of shortenings, margarines, salad and cooking oils. A recent report (16) describes a novel process developed in wartime Germany for increasing the flavor stability of soybean oil. This method, based upon the assumption that reversion is caused by lecithin, essentially comprises removal of the lecithin from freshly-extracted oil by water-washing and inactivation of remaining traces by the addition of small amounts of citric acid during deodoriza-

tion. Tests at the Northern Regional Research Laboratory of the United States Department of Agriculture (4) using this technique confirm the claim that elimination of phospholipids improves flavor quality. In this connection it is noteworthy that phospholipids are believed responsible for the flavor instability of dehydrated eggs (17).

Other proposed measures for minimizing the occurrence of flavor reversion include better selective hydrogenation (18, 19, 20), solvent fractionation for separation of saturated from unsaturated glycerides, selective adsorption, improved farming practices, better storage, and improved methods of oil recovery and refining.

During the past decade, the procedures in plant practice and in the laboratory have eased the urgency of the problem, but the fact remains that the problem of flavor instability in soybean oil has not been solved. Many observers believe that when surpluses in vegetable oils plague the country, soybean oil will maintain its position in the edible field only if its reversion tendencies are eliminated.

Fundamental research on soybean oil in the edible field has not been especially significant. As a matter of fact, most of the work on flavor stability of vegetable oils, particularly soybean and linseed, both hardened and unhardened, has been done over the relatively short period of approximately five years. Although much has been accomplished, the solution to the problem of the inadequacy of soybean oil in the edible field is not "just around the corner."

It is the competent opinion of those most conversant with the use of soybean oil in the margarine and shortening industry that if the impetus given to fundamental research on soybean oil during the past War emergency continues unabated and on a broadening scale during the next 5 years, a solution to the problem of its flavor instability is possible, and therefore its future in the edible field in competition with other vegetable oils is bright.

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THE FUTURE OF SOYBEAN OIL *in American Industry*

By DR. RALPH H. MANLEY

THE SOYBEAN is *not* a wonder crop. Thousands of "Cinderella" publicity stories to the contrary, it is not all things to all men. Certainly, it is not a universal panacea for all the ills of mankind.

No one has found or is likely to find a way of using it in the atomic bomb, nor do I expect my next suit of clothes to be spun from soybean fibre.

Nevertheless, this agricultural immigrant from China has won for itself a useful, important and permanent place in our national economy, and the future promises to make it even more attractive to the producer, processor and ultimate user alike. This fact is already evident because of the versatility of the soybean itself and also because of volume statistics covering its industrial utilization.

It has been estimated that the soybean in one form or another, appears in more than 4,000 individual products. To the farmer, it is a means of soil improvement, a valuable hay crop and a source of high-protein livestock feed. To industry, it offers edible and industrial protein and, of course, soybean oil. Although nearly every part of the soybean plant has played a role in "soybean progress" and certainly will contribute to its future, it is soybean oil which offers the most optimistic and conclusive answer to the question: "What's Ahead for Soybeans?"

NO OPTIMISM 20 YEARS AGO

Those who made such a bold statement 20 years ago, in fact those who expressed the slightest optimism concerning the future of soybean oil, were immediately open to violent attack. Doubting Thomases were quick to point out the oil's deficiencies, slow in recognizing its values. They were ready to admit that the 335 million pounds of soybean oil imported in 1918 saved us from fat starvation during a war period. But they were also ready to remind us that this Oriental oil was of inferior quality—that it left a decidedly unpleasant taste on the American palate.

Furthermore, they backed up their pessimism with what appeared to be sound chemical reasoning. They pointed out, quite correctly, that soybean oil is an "in between" oil, occupying much the same position as the poor creature which was rated neither "fish nor fowl." Soybean oil is still being classified as neither drying nor non-drying. Rather, it is called "semi-drying," a term which is descriptive but which unfortunately sounds as useless as a pink elephant.

Actually, modern terminology has shown that the "in between" nature of soybean oil is an asset, for it means that the oil can be modified for either drying or non-drying uses, thus opening a wide range of industrial applications.

Largely because of its "in between" nature, soybean oil has also become the nation's most diversified vegetable oil, with uses in products ranging from margarine to paint, varnish and enamel. During recent years, its application has been determined primarily by the requirements of war and postwar adjustment. Since food is the crying need of nations at war, the government restricted soybean oil usage, channeling 90 percent of it into edible products. Of this total, roughly 47 percent went into shortenings, 42 percent into margarine, and the remainder was used in salad oils, sardine and tuna fish canning, potato chip manufacture and in cooking, frying and other edible applications.

SOYBEAN OIL'S WAR USAGE

The 10 percent left for industrial purposes found its way into paint, varnish, soap, linoleum, oil cloth, printing inks, core oils and other less important products.

On the surface, the fact that non-food industries used only 10 percent of the soybean oil produced might seem alarming, particularly in view of increasing supplies of coconut, palm, sesame, babassu and other imported edible oils. However, it must be remembered that non-food industries used this relatively small amount of soybean oil only because soybean oil was not available to them. Government restrictions have now been discontinued, and the industrial use of soybean oil is growing rapidly. With the application of wartime technological discoveries, that growth will be further accelerated, all of which indicates a brilliant future for soybean oil in non-food products.

Judging from present indications, however, soybean oil will not have to depend upon industrial usage alone. It is quite evident that it will be able to hold its own as an edible oil. True, it will face keen competition in the years ahead, but I believe it has entrenched itself permanently in the edible oil industry.

INDUSTRIAL USES

In the non-food, industrial field, the uses of soybean oil may be divided into two principal classes: first, uses calling for a non-drying oil, and second, uses requiring an oil with drying properties. Under the first category, soap manufacture offers one of the most promising outlets for increased quantities of soybean oil.

As a semi-drying agent, soybean oil faces a limited future market in soap products since such oils are used mainly for making liquid soaps and potash jells, both of which use a relatively small volume of fats and oils. However, when soybean oil is hydrogenated, it is acceptable

for many types of soap. Since it has not been widely used for this purpose in this country, there appears to be room for considerable expansion in the soap field. The cost of hydrogenation remains as a stumbling block, but once the war-born scarcity of hydrogenating equipment is alleviated, soybean oil should become economically more attractive to the soap manufacturer.

In conventional soap manufacture, triglyceride oil or fat is heated in huge kettles with strong caustic to form soap and glycerine. The resulting two products are then separated from each other by the addition of strong salt water to the mixture. This treatment causes the soap to crystallize and rise to the surface of the kettle, leaving a solution of dilute lye, salt water and glycerine to be drawn from the bottom. The soap crystals must then be washed to remove residue lye and glycerine, and the crude glycerine solution taken from the bottom of the kettle must be clarified and distilled before it is industrially useful.

NEW TECHNIQUE FOR SOAP-MAKING

To simplify and improve this age-old soap-making process, a new technique is just now being introduced. By this new method, pioneered by Martin Ittner of the Colgate-Palmolive-Peet Co. a finely divided stream of triglyceride fat such as tallow or hydrogenated soybean oil, is allowed to rise through a tall column against a downward flowing current of water at relatively high temperature and pressures. As the droplets of oil trickle upward through the hot water, they partially dissolve and then react with the water to form glycerine and fatty acids. Since the glycerine is soluble in water at all temperatures, it is carried away by the downward moving column of water as fast as it is formed. By the time the oil droplets reach the top of the tower, the fat has become nearly 100 percent fatty acid.

Since the reaction is rapid and continuous and requires no catalyst and little labor, this method of fat splitting is an important step forward in increasing the efficiency of fatty acid production. The glycerine so produced is made industrially usable by simply boiling off the water in which it is dissolved, and the fatty acids are converted into high grade soap by mere addition of the proper amount of caustic.

As a drying component, soybean oil has found and will continue to find its greatest use in the protective coating industry. The paint manufacturer has long known that soybean oil is not as good a drying oil as linseed, but he now knows that it has valuable properties which linseed oil does not possess. For example, soybean oil has excellent color stability, does not yellow with age.

NON-YELLOWING PROPERTY

Linseed oil, on the other hand, "yellows" quite badly, and consequently is unsatisfactory for some light-colored paints and interior enamels. This important non-yellowing property is due to the fact that soybean oil contains only from 3 to 9 percent of linolenic acid as compared with 25 to 55 percent of this compound in linseed oil.

Once the scientist recognized the significance of this fact, he rolled up his sleeves, improved the drying power of the "in between" oil and developed entirely new types of coatings which take full advantage of its unique properties. Upon the success of these coatings depends much of soybean oil's industrial future, and that future now appears exceedingly bright.

At present, the largest and most important industrial use of soybean oil is in the manufacture of modified alkyd resins, prepared by reacting fatty acids from soybean oil with glycerol and a dibasic acid. Such resins can be pigmented to yield highly resistant coatings which dry rapidly because of the inherent nature of the resin itself and which are non-yellowing because the soybean oil fatty acid mixture contains little linolenic acid. During World War II, these modified alkyd resins, in the form of varnish or enamel, served as the world's best coatings for protecting airplanes, superstructures of ships and other surfaces exposed to the elements.

To the manufacturer, modified alkyds are attractive from an economic as well as a technical standpoint, for they can be produced directly from soybean oil without converting that oil into its component fatty acids. Rather, the conversion takes place during the reaction, liberating glycerol which is needed for alkyd resins. Because of their economic and technical soundness, modified alkyd resins undoubtedly will offer an outlet for increasingly larger quantities of soybean oil.

Another technique which should expand the market for soybean oil in the protective coating field is the maleation of the oil. In this simple process, soybean oil is heated with a reagent known as maleic anhydride. The consequent reaction yields an oil which dries faster and produces harder films when formulated into varnish.

RALPH H. MANLEY

The In-Between Nature of Soybean Oil Is a Tremendous Asset — Not a Liability. Its Future Is Limited Only by Man's Imagination. Dr. Manley is Chairman of the Soybean Research Council.

SOYBEAN OIL CONJUGATION

Still another modification is the conjugation of soybean oil. In this process the unsaturated linkages—that is, the type of linkages between carbon atoms which permit an oil molecule to "absorb" oxygen —are made to shift so that they occur alternately in each oil molecule. This condition of alternate unsaturation, known as conjugation, results in improved drying power. In fact, experiments conducted at the Northern Regional Research Laboratory of the U. S. Department of Agriculture have shown that paints formulated with conjugated soybean oil "set" two to three times as fast as those from ordinary soybean oil. At present, however, the conjugation process is somewhat cumbersome and has not been widely accepted. If it can be simplified, it will have a more significant effect upon the expanded use of soybean oil.

A technique known as thermal polymerization or heat bodying is of more immediate value. It consists of heating soybean oil for long periods at high temperatures in an inert gas or in a vacuum. This causes one oil molecule to link with another, thereby building up a chain or polymer with increased drying power. Since the apparatus required for "bodying" is relatively simple, it is now used widely.

Unlike "bodying", the relatively new procedure called molecular selection or solvent separation requires rather elaborate equipment. It is important, however, because it divides soybean oil into two fractions; one may be used in foods, while the other is an improved drying oil, virtually comparable to linseed oil in drying time. In other words, molecular selection or solvent fractionation takes full advantage of soybean oil's "in between" nature, and is expected to play an increasingly significant role in the future of the soybean.

FATTY ACIDS INDUSTRY

While the protective coating industry itself undoubtedly will remain the largest user of soybean oil for non-food applications, another young and closely related industry has appeared on the American scene to increase the oil's economic potential. I refer, of course, to the fatty acid industry, which was born many years ago but which just recently reached its adolescence, and now faces a lifetime of growth and public service.

The fatty acids obtained by splitting soybean oil can be used not only in the manufacture of modified alkyd resins, but also in the preparation of entirely different and remarkably effective drying oils. These oils are made by combining soybean oil fatty acids not with glycerol, as they are combined naturally, but with a synthetic alcohol such as pentaerythritol or sorbitol. Since these alcohols can attach themselves to more fatty acids with drying properties than can glycerol, this procedure yields an oil with greatly enhanced drying power.

In addition, individual, separated fatty

(Continued on page 54)

SOY PROTEIN IN INDUSTRY

What's Ahead?

By A. K. SMITH

Northern Regional Research Laboratory[1], Peoria, Illinois

THE IMPORTANCE of soybeans to farmers of the Middle West and the nation as a whole when measured by the cash income derived is greater than the returns from any other oilseed crop grown on the farm. Such a record for a commodity that was introduced relatively only few years ago is exceptional and of far-reaching possibilities.

In considering the entire soybean protein supply we find its principal outlet is stock feed. Soybean protein, however, has many other uses which are still in their early stages of development. It is noteworthy, then, that in furthering such developments, the low cost of producing soybean protein is as important to the expansion of industrial utilization as is its utilization in stock feeds.

Proteins have become industrially important only in comparatively recent years. Their slow development may be attributed to (1) their great importance for foods, thus restricting the available supply for industrial application, and (2) the exceedingly difficult chemistry of the protein molecule. Of all natural products, the proteins present the most complicated puzzle with which science has to deal.

The fundamental problem of protein supply, however, has changed in recent years from one of scarcity to one of plenty. Scientific developments in agriculture, the increased efficiency of crop production through mechanized farming, and the introduction into this country of the soybean have been mainly responsible for this change.

In looking to the future of soy protein in industry, it is important to keep in mind that the term "industrial protein" refers to a number of products. They differ in protein content, ranging from the 44 percent, occurring in soybean oil meal, to the isolated protein which is essentially a pure product. Each variety or grade of protein finds utilization commensurate with its properties and cost.

In evaluating what's ahead for soy protein, we shall consider the utilization of the soybean oil meal and the isolated protein. Under isolated protein we shall discuss the problem of whey disposal and its influence on locating protein refining plants, protein competition, protein characteristics and protein applications.

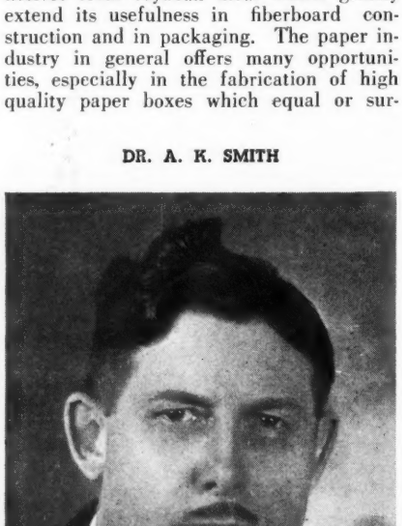
SOYBEAN OIL MEAL

Dehulled soybean oil meal contains about 50 percent protein and is not only a raw material for making isolated protein but has several important industrial applications. It makes an excellent glue, one having good water resistance, and it finds application where low cost is essential.

Soybean-meal glue was introduced to the Douglas Fir plywood industry by the I. F. Laucks Co. about 1927, and has since played an important part in plywood development. The annual use of soybean-meal glue in fabricating plywood from both hard and soft woods has reached 45 million pounds. Incidentally, the tonnage of soybean glue used in plywood for the past 10 years is larger than that of any other single type of glue. Another well-established and substantial use of this glue is for wallpaper coating. During the war, soybean oil meal was used in conjunction with casein or isolated soy protein for brush coating of paper. The results were so satisfactory that this use may be permanently adopted by the paper industry.

Because of the low cost of soybean meal, its good adhesive strength, and water resistance, other substantial uses may be anticipated. The development of tacky adhesives from soybean meal would greatly extend its usefulness in fiberboard construction and in packaging. The paper industry in general offers many opportunities, especially in the fabrication of high quality paper boxes which equal or surpass similar boxes of wood construction. The fulfillment of such applications would require large quantities of soybean meal.

DR. A. K. SMITH



ISOLATED PROTEIN AND THE WHEY PROBLEM

Isolated protein may be defined as a product derived from its source material by chemical methods. Such a product requires considerable technical skill in both isolation and utilization.

In addition to the technical problems involved in protein isolation there also occurs in this process a serious problem of waste disposal. In producing isolated protein two other fractions are obtained. One of these is a solid residue containing a relatively high percentage of unextracted protein and which may be used in feed mixtures or for extending phenolic-resin glues and plastics. The other fraction of the meal comes out of the process in a dilute-water solution. Approximately one-third of the original meal appears in this solution and for convenience is called "whey." This whey contains proteins and sugars which, if recovered, would be usable as feed, but evaporation is the only method now available for their recovery and this is not economically feasible. Disposal of the whey as sewage is now restricted in many localities where governing authorities are attempting to prevent polution of lakes and rivers. However, the large rivers such as the Mississippi, Missouri, and Ohio may be open indefinitely to sewage disposal. It is thus apparent that the waste-disposal problem imposes certain restrictions on the location of a plant for isolating soybean protein. A sewage-treatment plant is the only other acceptable method for disposal of whey but future research may find a more economical and practical procedure.

COMPETING PROTEINS

Proteins may be derived from either plants or animals, but since 6 to 10 pounds of vegetable protein is generally used up in making a pound of animal protein it is evident that, on a primary product basis, the vegetable proteins have an unusual cost advantage. Because of the demand for meat and milk, the only sources of animal proteins for industrial use, are the wastes and leftovers of the meat-packing industries and the residual skimmilk of the dairy industry. Thus, the byproduct nature of industrial proteins of animal origin will probably be their limiting factor. On the other hand, no such visible limitation exists for the production of vegetable proteins.

The possible sources of supply of vegetable proteins are numerous. The sources of vegetable proteinaceous materials other

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Soy Can Stand up to the Competition of Other Proteins and Will Be Available in a Quantity to Meet All Industrial Needs. Dr. Smith Has Been Engaged in Research on Soy Proteins for Many Years.

than the soybean, occurring in large tonnage, are cottonseed, flax, peanuts, wheat, and corn gluten. While research work is in progress toward the isolation of protein from all members of this group, only soybean protein and zein from corn gluten have reached commercial production. It is rather significant that the soybean, a crop new to the United States, has been the first source of a commercially-isolated vegetable protein.

From the standpoint of domestic production the commercially-important proteins rank in order of packing-house glues, soybean protein, milk casein (exclusive of imported casein), and zein. It is worth noting that of the four important proteins, that from soybeans ranks second.

Soybeans have had a natural advantage over the other proteinaceous materials in attaining first position as a source of isolated vegetable protein. This is because, during the process of isolating soybean or other vegetable proteins, it is necessary to use solvent-extracted flakes as the basic raw material. The high temperatures developed in hydraulic or screw-press operations bring about carmelization of the sugars and denaturation of the protein to give a product that is dark in color and of difficult solubility.

The natural advantage of the soybean occurs in its characteristic property of forming flakes when passed between smooth roles, which make it easily adaptable to solvent extraction. This apparently small advantage of the soybean over other oilseeds is in practice an important factor in protein isolation and will continue so until engineers develop new and satisfactory methods for solvent extraction of the other oilseeds.

PROTEIN CHARACTERISTICS

A single protein does not possess all the desirable properties needed for the many and varied industrial applications. The different properties of proteins, combined with their different price structures, have kept them, in a large measure, in separate fields of application and minimized competition. The job of the chemist is to develop methods for modifying protein so that its use may be widely diversified. For example, a dark-colored protein is looked upon with disfavor regardless of its other properties or of its intended application for uses such as paper coating, textile fiber, paper sizing, water paints, a very light color is an essential property. Soybean protein meets this requirement as well as many others. Water solubility is often a desirable characteristic and the packing-house and fish glues are the only ones possessing this property. Zein is distinctive for its solubility in organic solvents, while soy protein and milk casein require alkalies for their dispersion. Formation of strong gels, good adhesive strength, water resistance, the property of forming tacky dispersions, and the ability of molecular orientation are all desirable characteristics.

It is important to point out that the properties of proteins just mentioned constitute a segment of science that is poorly developed. Protein molecules are very large, exceedingly temperamental, and their reactions cannot be studied except by long and complicated procedures which I do not intend to discuss here. However, I do wish to emphasize the nature of protein research and to make clear my point of view that the greatest rewards in protein research are yet to come. After we have solved the many mysteries which govern protein behavior, we can expect wider utilization to follow.

PROTEIN APPLICATIONS

In appraising the future trends in the utilization of soybean protein, the possibility of extending present uses and developing new products must be considered. The most important uses at present are found in making paper coatings, paper sizing, water paints, shotgun shell casings, washing compound adjunct, textile fibers, and foam stabilizer for fire extinguishers. It was reported that during World War II, the greater share of soybean-protein production was allocated to the Navy for use as a foam-stabilizer in a fire-extinguisher compound. It was unexcelled in this application.

The production of textile fibers was reported recently as passing from laboratory to plant-production scale. This new fiber, if commercially successful, promises to be one of the largest outlets for soybean protein.

Paper coatings normally made with milk casein have provided the largest single use for protein for many years; however, the urgent demands of the food industry for dry-milk solids have developed serious shortages of casein which are gradually being relieved by adoption of soy protein.

As the protein industry stands at the present time, the soybean is in the most advantageous position to supply additional requirements for expansion of old uses and for new developments. Expansion of the present uses of protein may eventually call upon the soybean to supply their added requirements. Such uses include tire-cord sizing, textile sizing, bookbinding, sandpaper adhesive, abrasive wheels, match-head binders, cork binder for gaskets, remoistening adhesives for labels, tacky glues, paper laminations and others.

SUMMARY

In our review of what is ahead for soy protein in industry, we have pointed out that soybeans are available in sufficient quantity to supply any and all demands of industrial requirement, that soybean protein can be produced in various grades and in a price range to meet competition of other industrial protein and that soybean protein has chemical and physical properties which make it adaptable for many industrial applications. The general increase in protein requirements and development of new products lead to the conclusion that production of isolated protein and the utilization of all grades of soy protein will continue to increase substantially. The rate of increase in utilization of soy protein and its associated products will be dependent, in a large measure, on the progress of research in protein chemistry.

What's Ahead for SOYBEAN OIL IN PAINTS?

By FRED J. STARK

President, Sicca Soya Paint Co., Inc.

THE PROBLEMS involved in the utilization of soybean oil are of vital interest to all of us. A new potential use for soybean oil as a paint base presents a very powerful influence that concerns the entire future of our business and a new premium outlet or market for the oil you produce.

It is a genuine pleasure for me to discuss the prospects for the use of soybean oil in paint with you because it represents a subject in which we are both vitally concerned. I am sure that all of our soybean family whether they are producers of beans, processors of beans or refiners of oil are vitally interested in stabilizing the price of oil.

The paint industry is now definitely interested in the use of soybean oil in its standard lines of paint products. The potential amount of soybean oil which can be used as a base for paint is very large. One in my position hesitates to make too optimistic a prediction because of the many factors which govern the acceptance of a new product. Let me say however that we believe that if public acceptance can be won over a very considerable portion of the soybean oil produced can be put into paints in the very near future.

You raise and process the beans for meal and oil. We want to use this oil as a paint base. The success with which we meet the problems in processing the oil and developing this market for the oil is certain to play a tremendously important part in the results which you attain from raising and selling your soybeans. If we are able to develop new and wider uses for soybean oil we automatically increase the demand and stabilize the market for the raw product which you produce.

Soybean oil is now used primarily as a food product. We do not believe that this picture will change a great deal in the next few years. I wish to point out however, that soybean oil in food products is in

direct competition with the other vegetable oils and its price is governed by the availability and price of these competitive oils because none of the oils used are in themselves essential in the production of food products. Hence we feel that a substantial market for soybean oil in paint will be of definite advantage in stabilizing the market for this oil.

Our laboratory has found a method by which a standard line of high quality paints can be made by using carefully refined soybean oil as the sole oil in the paint vehicle. We have developed this paint formulation around the characteristics and properties of the oil itself. The quality of this paint depends on the unique properties of soybean oil. This paint formulation is in no sense a conventional paint formula. Thus the market we see for soybean oil is specific in that we must have and can use only soybean oil. Substitution either with drying oils or edible oils is out of the question in this new formulation.

This claim for a new soybean oil paint has been advanced a great many times in the past. A number of efforts have been made to use soybean oil in paint products. There is no disguising the fact that some of these efforts were premature. We find that many of the so-called soybean oil paints contained high percentages of other oils and relatively small amounts of soybean oil. Other paints using relatively large percentages were proved unsatisfactory. There was a natural temptation to want to use soybean oil as part of the label on a can of paint. It aroused interest and it had sales appeal. However, the resulting products as you know, when they were put on the market resulted in a black eye for the words soybean oil paint in the mind of the public.

DAMAGE BY OPPORTUNISTS

We might attempt to minimize the effect by saying that the losses were confined to a few opportunists in the paint manufacturing field and their misguided buyers. We all know, however, that it doesn't end there. It was the old case of "Give a dog a bad name." The entire progress of research and refinement in the processing of soybean oil with the view of producing a paint base was upset and disturbed. We still suffer from these first ill-advised offerings but thanks to the persistance of those who recognized the vast market for soybean oil as a paint base and thanks to their certainty that a method would be found for making soybean oil a superior product research has gone on. Recognizing the prejudice in the public mind soybean oil refiners who have been developing new processes have been very hesitant in approaching the market again with a soybean oil base paint. However, they have been and are developing processes which bid fair to become acceptable to the formulator of good paints.

Two of these processes involve the fractionation of the oil into its drying and non drying components. The first is commonly known as liquid-liquid extraction based on the difference in solubility of the drying component and the non drying components in solvents which do not readily mix. Usually furfural and a like hydro carbon are used for this separation. The second means for separating the drying component is by the use of liquid propane under pressure.

Another method for producing an acceptable drying oil involves the use of a chemical catalyst to conjugate the oil. I know very little about these processes except that they seem to be a means for incorporating soybean oil in conventional paint formulas. Our method, as I have stated, involves a formulation of paints from the refined oil without physical or chemical treatment.

Paint Properly Made from Refined Soy Oil Is Now Superior to Paint with Conventional Bases, Says the President of Sicca Soya Paint Co., Peoria, Ill.

There is no doubt that soybean oil from all of these processes will be used in paint formulations, each paint factory selecting the processed soybean oil they believe to be the best. In our experience a paint properly made from refined soybean oil now possesses features which make it superior to any previously produced paint with conventional oil bases.

Paint made with soybean oil base exhibits a smooth non-porous, highly durable surface which is very resistant to chalking and does not after-yellow or streak. It will cover almost any type of smooth surface such as wood, cement block or metals. It exhibits a freshly painted appearance for a good many years.

So far as we are concerned we would like to put our soybean oil paints on the market in the very near future but we know that the soybean paint industry cannot afford another black eye. This would be disastrous. We feel sure that we and other reputable paint manufacturers can begin to place soybean oil paint on the market but we must protect our industry against the unscrupulous or misguided paint formulator. We therefore want to recommend that you and your associates as well as ourselves make every effort to help establish a minimum of standards setting forth percentages of soybean oil to be present in each type and class of paint bearing the name of soybean oil.

As a final point I should like to emphasize that you are potential users as well as producers. Your group embodies the market for a healthy proportion of the product you are selling. You can be and should be a prominent force in developing and extending the usage of this product because in so doing you will be serving yourselves.

In conclusion we wish to invite everyone here to visit the house here in Columbus which has a one coat job of soybean oil paint inside and outside. This job was left half completed so that you might see for yourselves the advantages of a soybean oil base in paint. This evidence as well as other jobs 5 and 6 years old can be shown as monuments to the true value of soybean oil paints.

—s b d—

IMPORTS INCREASE

The United States returned to its prewar position as a net importer of fats and oils during the first half of 1947, reports *Foreign Crops and Markets*. Imports of fats, oils and raw materials in terms of fat totaled more than 400,000 short tons, nearly 2.5 times the quantity imported during the first half of 1946.

Exports from January through June of this year, however, were 41 percent of imports, while for the same period of 1946 exports were 121 percent of imports. This situation is due largely to increased receipts of copra from the Philippines and to smaller exports of lard.

Copra and coconut oil imports during the first six months were three times the imports for the same months of 1946 and were nearly as great as imports for the entire preceding calendar year. Imports of castorbeans and linseed oil were greater than for the similar period last year. Tung oil imports of 77 million pounds were double the quantity received during the full 12 months of 1946 and may be compared with the prewar annual average imports of 123 million pounds.

Looking at the paint demonstration house in Columbus are, left to right, Sewall D. Andrews, Jr., vice president of the chemical division of General Mills, Inc., Minneapolis; C. D. Brownell, sales department, Sicca Soya Paint Co.; and Fred J. Stark, Sicca Soya president, Peoria. Painted areas have one coat of a soybean oil base paint.

CARVER BROWN, Laddonia, Mo.

PRODUCERS

Production and Processing of SOYBEANS IN CANADA

By F. H. LEHBERG

COMMERCIAL production of soybeans in Canada is a comparatively recent development. The crop was first tested in the experimental plots at the Ontario Agricultural College in 1893. But interest lacked until, about 20 years ago, the Federal Dept. of Agriculture commenced active investigations into the possibilities of the crop. During the intervening years, hundreds of varieties and strains of soybeans have been introduced and tested for their suitability to Canadian conditions.

Notwithstanding this general academic interest in the crop, the commercial development of the soybean in Canada was not given any impetus until the war years when the economic importance of soybean production was emphasized to the Canadian government authorities by the disruption of trade and shipping which resulted in a very serious shortage of fats and oils in my country.

MOST OIL IS IMPORTED

Unlike the balanced fats and oils economy of the United States, Canada has imported approximately 50 percent of her total fats and oils requirements, and approximately 93 percent of her edible vegetable oil needs. Faced with a critical short supply position, the competent government authorities sponsored the production of soybeans, sunflowerseed, rapeseed and flaxseed to offset the ever pressing need for edible fats which had previously been imported into Canada from the United Kingdom, the Argentine, India, Africa, etc.

As you know, the efforts of government alone are not sufficient to promote a new agricultural development, for the producer needs to be assured that the industrial machine exists which will offer a permanent outlet for his crop and the investment required for the handling thereof at fair and profitable prices.

CRUSHING INDUSTRY

The development of a soybean crushing industry in Canada offered the producer an assurance that private industry had faith in the development, and assured him of an outlet for all his production since a previous lack of adequate processing facilities had been a handicap to the promotion of the crop. The Dominion and Ontario Departments of Agriculture and the principal soybean processors — among which I should mention Victory Mills Ltd. under the direction of its president, H. D. Egly who brought to us in Canada many years of invaluable experience in soybean production in the United States — undertook a most extensive educational and promotional program with the result that in 1947, we will produce more soybeans than heretofore in our history, or an estimated 1,134,000 bushels.

The Canadian production of soybeans represents only a very modest part of our needs for oil and meal, and we must of necessity continue to be an importer of vegetable oil-bearing raw materials including peanuts, soybeans, copra, palm kernels, etc.

Some idea of the progress made in the soybean program in Canada may be gained from the following statistics: In 1941, we seeded approximately 10,900 acres; in 1944, 36,200 acres with a production of 682,000 bushels; in 1945, 46,200 acres — production 844,000 bushels; 1946, 59,200 acres — production, 1,072,000 bushels, and in 1947, we seeded 67,488 acres which will produce an estimated 1,134,000 bushels.

MOST BEANS IN ONTARIO

The areas of production are primarily located in southwestern Ontario, but with the development of new varieties adapted to the wide range of soil and climatic conditions which exist in Canada, there is every reason to suppose that these areas will be increased over the next several years. The yields of soybeans in Canada are as good or better than those obtained in the United States.

During the early stages of production, soybeans were grown primarily as a forage crop and, prior to 1940, probably less than 25 percent of the total grown for all purposes was used for seed. At the present time, approximately 75 percent of the total acreage planted is harvested for beans.

The varieties most commonly grown in Canada are: A. K. (Harrow) which is late, very tall, yellow seeded and adapted only to southwestern Ontario. In the Harrow area, it matures in 135 days and is a good yielder. Mandarin (Ottawa), another popular variety, is medium maturing, tall, strong-strawed and yellow seeded, and it is favored throughout Ontario and western Quebec; approximately 125 days to maturity in the Ottawa area. Two other Canadian-developed varieties, Kabbott and Goldsoy, are being grown where early varieties are desirable. The American-developed varieties, Early-ana, Richland and Lincoln, are popular in the principal soybean producing areas of Ontario. A new variety, named Capital, will be available in larger quantities next year. This new variety is relatively early maturing, and a good yielder. We are hopeful that the areas of production in eastern Canada can be materially increased for we recognize that the large scale production of beans affords the best means by which Canada can render herself more self-sufficient with respect to edible vegetable oils.

USES MUCH LIKE U. S.

The pattern of utilization of soybean oil and meal in Canada corresponds closely to that of the United States since our industries are similar in type—producing not dissimilar end products.

Whereas in the United States during the past several years, large quantities of soybean oil have been used for industrial purposes, in Canada the acute shortage of edible oils necessitated certain consumption restrictions which included the reservation of all soybean oil for edible purposes. Of our total

consumption of soybean oil, approximately 70 percent will be used in the production of shortening, and the remaining 30 percent for sale as refined cooking and salad oils entering into the consumer, bakery and other food industries.

The consumption of soybean oil is approximately 15 times that of the prewar level. The increase in consumption is largely due to the decline in usage of other edible oils, primarily cottonseed, which have not been obtainable.

Soybean oil meal for feed has found a rapidly expanding market in competition with other vegetable protein concentrates. Livestock producers have shown a preference for soybean meal as compared with other protein feeds, and it is indicated that it will be used extensively in the future. This, I believe, follows the same trend as in the United States where it is also agreed that soybean oil meal has excellent nutritional properties. It is generally recognized that when soybean meal is used as a protein supplement for hogs and poultry, the requirements of the common animal proteins can be reduced with more economical growth production.

MIXED FEED INDUSTRY

An appraisal of future prospects indicates that when the meal is properly manufactured, its uniformity of composition, keeping quality and relative costs will place it ahead of other protein concentrates where it will be more readily sought after as a supplement or extender of animal proteins than it was in the 1930's.

There has been a marked expansion of the mixed feed industry in Canada and, in particular, in the popularity of commercial feeds; also, a larger percentage of farmers is feeding protein supplements, and these factors will create a greater demand for protein concentrates. Naturally, the actual level of the use of supplementary proteins will vary with prices of livestock and livestock products, and will be influenced by the relative prices of feeds and livestock products.

During the war years, the industrial usage of soybean oil meal was retarded by government restriction due to the necessity of directing as much protein to the feeding industry as possible. Among the more promising outlets for soybean oil meal in Canada are the manufacture of water-resistant plywood glue, and for the manufacture of protein base protective coatings for, as you know, soy protein in calcimine and water-base paints results in a more water resistant and more stable product than if other types of protein are employed. In Canada, we are also very interested in the adaptation of soybean protein to the paper industry in view of the volume of output of this industry, and the development of a soy protein sizing is being studied.

Canada Will Produce Its Largest Crop from Its Largest Acreage This Year. The Author, Until Recently Dominion Fats and Oils Administrator, Is Now with Victory Mills, Ltd.

The acceptance of soy flour of improved quality in the edible trade in Canada has been established during the past several years. The use of soy flour in pre-mixed foods, primarily in the baking industry, has markedly increased. I believe we all recognize that the taste and flavor of soy products have been a deterrent to their acceptance in the edible field, but in view of the progress which has been made in improving palatability, it may be safely conjectured that a more ready acceptance will be obtained in the future.

While industrial and food uses of soybean oil meal are very promising, the primary utilization of the meal will continue to be in livestock feeding, and with a continued measure of economic prosperity giving a satisfactory return for livestock products, we would expect a strong feed market for protein concentrates.

The sharp upward trend in the use of soybean oil already alluded to can be maintained and increased provided further technical improvement in refining, keeping quality and flavor reversion are made, and I would confidently expect in view of the vast amount of research which is being conducted in this field that in the near future, soybean oil will be in a position to compete with the presently most acceptable edible vegetable oils on the world markets inasmuch as it is now used in the same food products as cottonseed, peanut and sunflowerseed, with equally good results.

The Canadian protective coatings manufacturers look with considerable envy on the position of their United States counterpart when they realize that the decade-long ambition of the soybean enthusiast has today been realized in that soybean oil is being employed in ever increasing quantities after suitable processing in admixtures with tung oil. It is to be hoped that the supply position in 1948 will permit of the usage of soybean oil in Canada for industrial purposes, for manufacturers are pressing most strongly for the use of soybean oil in the protective coatings and glyptol resins industries. Canadian manufacturers would be very interested in using millions of pounds in their formulations but, unfortunately, the overall supply position in the fats and oils field in Canada does not permit of any diversion as yet for purposes other than for human consumption.

I look forward to the perfection of fractionation processes which will make it possible to separate soybean oil into portions that are superior to the original oil for their present uses. By virtue of its fatty constituents, soybean oil is more adaptable to fractionation with resultant effective use of the end products obtained than most other oils for the relatively high percentage of oleic and linoleic acids together with the other constituents can be varied with appropriate technological technique.

During the past few years, there has been much promotion, research, perseverance and energy thrown into the soybean program. The confidence displayed in the crop is more than rewarded by the increase in production and usage. The soybean program is particularly important to Canada since it is one of two suitable edible oil crops which we can produce to partially meet our needs, and we shall continue to persevere with the production and development of the usage of the soybean.

Controlling Weeds in Soybeans

By C. J. WILLARD

THOSE of you who were on the field trip Thursday saw demonstrated in the field most of what can profitably be said about weed control in soybeans. This paper will largely summarize what you saw there.

Not many of you here today were at the meeting of the American Soybean Association at the Johnson Farms in Williams County, northwestern Ohio, in 1921. Your speaker was at that magnificently staged demonstration of soybean culture and possibilities, and "Soybean" Johnson showed what was then and still is the most nearly perfect answer to the weed problem in soybeans. The Johnson Farms believed in growing soybeans in rows and cultivating them. They believed in it so strongly that they grew soybeans for hay in this manner. Incidentally, they grew soybeans in 21-inch rows and cultivated them with beet machinery—a combination

that is hard to beat for maximum results.

How well they succeeded in keeping down weeds in the soybeans is shown by the fact that in 1922 they entered a field of corn in the 100-bushel corn contest which followed first year sweet clover preceded by several years of soybeans. This field made 106 bushels of corn per acre without ever being touched by an implement after the corn planter left the field. There was no cultivation of any kind, rotary hoe, harrow, or cultivator, and a yield of 106 bushels per acre is not obtained with weed competition. The growing of soybeans in well-cultivated rows had so thoroughly cleaned that ground of weed seeds that it was possible to grow the corn crop without any cultivation whatever.

It is not the purpose of this paper to discuss in detail the many problems involved in the question of growing soybeans in rows or drilling them solid. The writer feels that growing in cultivated rows is in most respects the basic solution for the weed problem in soybeans. It is his conviction that on most farms, if we are to introduce soybeans into the rotation as a regular year-in and year-out crop, they must be grown in cultivated rows to give satisfactory results.

However, for a variety of reasons, a large acreage of soybeans will continue to be drilled solid. It is here that our most serious weed control problems arise.

SUPERIOR FOR SMOTHER CROP

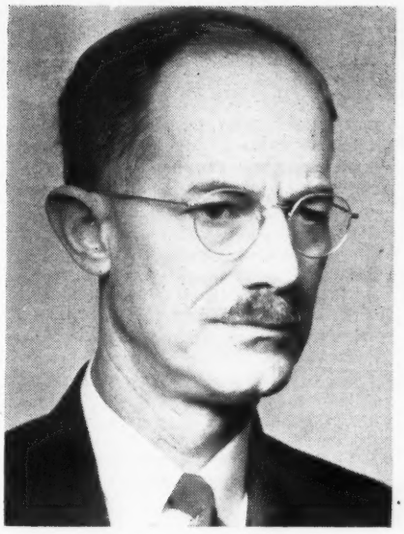
Once established, soybeans are a superior weed smother crop. If we can establish a solid cover of soybean leaves above the soil, we need not worry about most of the weeds that germinate thereafter. Practically no weeds can survive under such a canopy. Our problem is to put this cover on top of the weeds.

We obtain this, first of all, by preparing the soybean land early and keeping it worked from time to time so that it is well settled, and free of weeds seeds up to the time of planting the soybeans and with a high percentage of the weed seeds in the surface layer germinated. Then we work this well-settled seed bed shallow in order to bring up as few new weed seeds as possible, plant the beans shallow in moist soil when the ground is sufficiently warm so that they germinate in a minimum time. This is especially important. Beans planted early fall behind many weeds which can grow vigorously at lower temperatures than soybeans. Soybeans can endure fairly low temperatures, but they do not grow well at them.

This, of course, means later planting of the beans. In practice, the loss from this is small. In his study of the life history of soybeans, Dr. Borst found that the development of beans planted from April 25 to May 25 at Columbus, Ohio, was practically identical. There is a slight gain in yield for early planting where weeds are sufficiently controlled, but compared to the loss from weeds, it is unimportant. If we are to drill beans solid, we must not drill them until the ground is warm enough so that the beans can start with maximum speed.

Shallow planting is, of course, always a necessity in planting beans, and is particularly necessary for the rapid start necessary to get ahead of weeds.

Thick planting is also important, for a number of reasons. Thick-planted beans break through a crust more certainly than



C. J. WILLARD

A Discussion of New Weed Control Methods Including Flame Weeding and Rotary Hoe, by This Well Known Ohio State University Weed Expert.

thin-planted. Any cultivation will kill a certain proportion of the beans and extra seed must be planted to make up for this. The more plants on a given area, the sooner there is sufficient shade to keep down weed seedlings. Furthermore, thick-planted soybeans grow tall and so get above the weeds more rapidly than thin-planted beans. In Dr. Borst's studies, 6 weeks after planting, soybeans planted thick averaged 3 inches taller than thin-planted soybeans of the same age.

On warm, well-prepared soil, the weeds as well as the beans will sprout rapidly. The weeder, harrow, or rotary hoe is recommended to control these weeds in the early stages. The rotary hoe is the best implement under most conditions. It will break crusts on any soil if sufficient speed is given it, and it gets small weeds with less damage to the bean plants than the harrow. The weeder is a beautiful tool on the loose, highly organic soils to which it is adapted. On heavier soils, after a rain, it is useless.

These tools should be used when the weeds are quite small—when the weeds are "in the white"—just coming through—if possible. It is impossible to overstress the importance of timeliness. Cultivation when the weeds are "in the white" will do the most damage to the weeds—and also to the beans, but that cannot be helped. I have been asked on how large beans we can use a harrow or rotary hoe. Experimentally, we have harrowed beans 10 inches high without appreciable injury, but this makes no practical sense. A good solid stand of beans 10 inches high is in no danger from any weeds which can be killed by a harrow or rotary hoe. At the Sinclair farm Thursday, you noted the outstanding results from one well-timed rotary hoeing.

However, there will be seasons when the ground will be wet at the time when the rotary hoe should be used and the weeds will get so much of a start that they cannot be controlled in this way. That is the fundamental hazard of drilling beans solid and nothing can completely get away from it. Late shallow planting on an early prepared seed bed is the surest insurance. That is even more important than the rotary hoe.

ROTARY HOE IS VALUABLE

The rotary hoe is also valuable in the culture of beans in cultivated rows. No shovel cultivator will get the weeds in the bean rows, and an initial rotary hoeing or harrowing at the right time helps greatly in obtaining a clean bean field.

An important method of reducing the amount of weeds in soybeans is to reduce the amount of weed seeds and perennial weeds in the soil in which they are growing. This means that we must consider the rotation in which soybeans are grown. Soybeans have now been grown as a regular crop long enough so that the rotation pattern into which they fit is becoming apparent. Soybeans compete directly with corn for a place in the rotation. Even when drilled solid, we cannot replace wheat or oats with soybeans in the eastern Cornbelt because the hay crop cannot be sown in them. The similarity of soybeans to corn is obvious if they are sown in cultivated rows, and soybeans continue to compete with corn as a cash crop, when they are sown solid. Undoubtedly, erosion is less in a well-established solid stand of soybeans than it is in a cultivated crop, either corn or soys.

We can hardly afford to leave corn out of Cornbelt rotations. Consequently, our problem is to fit corn, soybeans, small grain to provide some return from the land in the year the legumes and grasses are sown, and the soil-building legumes and grasses into the rotation.

SOYBEANS BEST AFTER CORN

Except for special cases, these units in the Cornbelt rotation will best be arranged in that order. No material advantage to soybeans has appeared when they follow sod. Soybeans after one year of corn do as well or almost as well as soybeans after sod. Corn after soybeans does not do nearly as well as corn after sod. Consequently, the economical order is sod, corn, soybeans.

The loss of soil organic matter in this rotation may be reduced by sowing ryegrass, yellow sweetclover, (*not* white sweetclover) or a mixture of the two, in the corn which is to be followed by soybeans. This can be plowed under early and furnishes a remarkable amount of organic matter.

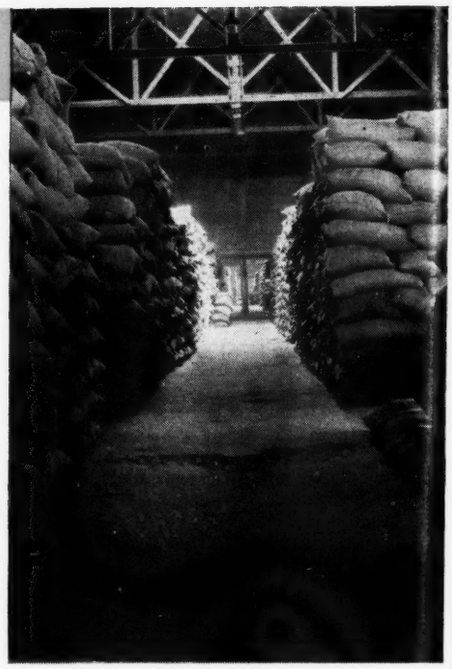
Following corn with soys gives a chance to control weeds in the corn. This usually is more effective than controlling weeds in soybeans. There should not be an accumulation of weeds and weed seed from the sod. Production of weed seed in the small grain stubble may be prevented by proper clipping. With this rotation in effect, there will be less of

(Continued on page 48)

WORLD TRADE

Export Demand for Soybeans

By FRED J. ROSSITER



Soybeans stored in a warehouse in Dairen, Manchuria.

BETWEEN World War I and World War II an average of 70 million bushels of soybeans moved in international trade each year. European countries and Japan were the principal importers. The soybean as a source of oil and oil cake was firmly established in Europe prior to World War II.

Since hostilities ceased in 1945, European countries have been inquiring where soybeans can be obtained. I have been asked to give some indication as to the export demand for American soybeans during the next 10 years. I am sure there is a great deal of interest in this subject not only on the part of our soybean industry but also on the part of the importing countries of Europe and the exporting areas of Asia. No one of course dares to predict what the export prospects will be for American soybeans 10 years hence. I do not know at this time how many bushels of beans will be exported from the 1947 crop. I am glad, however, to discuss some of the factors that will influence the export demand during the next few years.

WORLD DEMAND AND SUPPLY

In order to appraise the foreign demand for American soybeans, we must examine the supply of and demand for fats and oils in other parts of the world. Since soybean oil has many uses and many competitors, it is recognized that either a domestic or a worldwide shortage or surplus of one fat or oil affects the price and consumption of all others.

Although the total production of fats and oils in the United States is continuing above the prewar level, production in most parts of the world remains below prewar. World production of 21 major edible and industrial fats and oils during the prewar period (1935-39) is estimated at about 21.5 million short tons oil content. This estimate includes all the important vegetable oils such as soybeans, cottonseed, peanut, sunflower seed, coconut, palm and flaxseed as well as the animal fats—lard, tallow, butter and the marine oils—whale and fish. The production of the same commodities for 1946 was estimated at 17.7 million tons or about 20 percent below the prewar average. A preliminary estimate for 1947 places the production at about 19 million short tons or at about 13 percent below the 1935-39 annual output.

The major reductions when compared with the prewar period are in Europe, Asia and Africa. In Europe the reduced production of about 1½ million tons is principally in animal fats—lard, tallow and butter. This reduced output is likely to continue for some time on account of the shortage of grain and protein feed for livestock. Although an increase in oilseed production has occurred in some countries this expansion will be limited by the necessity of using as much land as possible for the production of bread grains.

In Africa, the reduced peanut production in French West Africa, palm oil in British West Africa, and cottonseed in Egypt places the total exportable supplies at about 600,000 tons oil content, or 40 percent below the prewar output.

PRODUCTION IN ASIA IS DOWN

Production in most Asiatic areas is below the 1935-39 level with the greatest decrease in the Netherlands Indies palm oil and copra, and in Manchurian soybeans. The phenomenal recovery of Philippine copra is not sufficient to offset the losses in other Asiatic areas. The volume of Philippine copra exports during the last 12 months has perhaps been the most sensational event in the fats and oils picture during the past year. The copra industry during the Japanese invasion came to a complete standstill with gathering, transportation and crushing facilities destroyed. Upon liberation, the Philippines, with help from the United States, rapidly restored the industry from a production and exports of zero to an output for the last 12 months of over 1,100,000 short tons of copra. This is more than 150 percent of the prewar average and has set an all time record.

In other parts of Asia, particularly in the Netherlands Indies and in Manchuria, political instability has kept exports at a very low level. In India production of peanuts, cottonseed, and flaxseed is below prewar, and with increased domestic consumption only small quantities are available for export compared with the prewar volume. Total exportable supplies from Asia, despite the record Philippine copra output, are still 1½ million tons of oil below the prewar figure.

SOUTH AMERICA ABOVE PREWAR

In South America total production of fats and oils is somewhat above the prewar level. But the exportable surplus at the present time is somewhat below. This situation has developed because of increased consumption in some Latin American countries and the trade management in Argentina. During the past 2 years the Argentine government practically ceased the exportation of oilseeds as such and has been the exclusive exporter of vegetable oils and oil cake. The government has also followed a price policy that has retarded the export movement.

Now let us take a look at the world demand for fats, oils, and oilseeds. During the 1935-39 period, the net world imports of fats and oils equaled about 6.5 million short tons of oil. In 1946 only about 2.9 million tons were available. In 1947 supplies have increased primarily as a result of the increased Philippine copra production and the Antarctic whale catch. It is estimated that about 3.5 million tons are available for export movement.

Some international nutrition experts tell us that as a result of the increased population total imports of 7 million tons of fats and oils are now required to bring the per capita consumption up to prewar level. This may represent the volume of imports needed to restore consumption to prewar levels. But the economy of many of these countries is so badly disrupted that it will be some time before many of them will be able to purchase their prewar volume of imports. It is noted that the effective demand from many foreign countries for fats and oils is not so great as it was a year ago. Many countries are watching their expenditure of dollars. For example, one foreign fats and oils representative in Washington told us early in August that his country was unable to purchase further supplies in the United States this year. The additional quantity of fats and oils needed to fulfill the present worldwide effective demand at current prices is uncertain. By effective demand is meant the quantity that countries will be able to purchase and does not represent the requirements or actual need. To fulfill present world effective demand it is believed that only a relatively small additional quantity would be sufficient. As the buying power in the importing countries improves the demand for fats and oils should increase beyond the present volume.

FOREIGNERS WANT OUR SOYBEANS

In spite of the present reduced effective demand for fats and oils foreign countries are interested in American soybeans. Many continental European countries have for many months been casting covetous eyes at our soybeans. Continental European countries before the war crushed 40 million bushels of imported soybeans annually whereas during the past 12 months they have crushed

less than 2 million bushels. These same countries during the prewar period crushed 1,300,000 short tons of shelled peanuts annually, while during the past year they have crushed less than 200,000 tons. These same countries during the 1935-39 period crushed 45 million bushels of flaxseed annually but during the past year they have crushed less than 2 million bushels.

The oilseed crushing mills in Germany were partially destroyed and in Italy they were severely damaged. But in the other continental European countries the crushing capacity is fully equal to that of prewar years. In fact, as a result of the conversion to solvent extraction, the capacity in several countries has increased. These countries for several months have been craving oilseeds to crush. They want to use their own facilities for crushing the oilseeds, refining the oil, and making their own margarine and shortening. They cannot afford to use their limited foreign exchange to purchase finished products and leave idle their own labor and crushing plants. Furthermore, European countries want oilseeds to obtain protein feed to rehabilitate their livestock industry.

TO GET EUROPEANS OFF RELIEF

I know that our own industry would like to have the business of crushing and processing the oilseeds for Europe. The same is true with wheat—our millers would like to grind the wheat, the bakers would like to bake the bread, and the margarine industry to spread the bread for sandwiches ready to feed the Europeans. However, I believe the American taxpayer does not want this country to continue large relief appropriations, but would like to have the European countries get on their own feet.

The oil mills of France, Belgium, the Netherlands and Denmark are operating in 1947 at about 22 percent of their present capacity whereas in the prewar years they operated at about 85 percent of their capacity.

Where are these continental countries going to obtain oilseeds to rehabilitate their industry? They formerly secured about 40 million bushels of Manchurian soybeans annually. This year they have obtained about 1 million bushels from that area. Our information is that soybeans are available in Manchuria despite the fact that production has declined materially. There is little prospect, however, of getting supplies out in the near future on account of unsettled political conditions in that area. The Chinese government appears to be anxious to export soybeans in order to improve their foreign exchange balance, but the latest word from that area is that the port of Dairen, the main export outlet for Manchurian soybeans, may not be opened for transportation to western Europe or the Western Hemisphere in the near future.

SOYBEANS MUST COME FROM U. S.

While many countries in other parts of the world have been growing soybeans experimentally, there is no evidence at the present time that any other nation will have any significant volume for export. Last year Brazil shipped 35,000 bushels to Denmark. Although Brazil is interested in growing soybeans, its production is not expected to expand materially in the near future. Australia probably will increase the production of soybeans but it remains to be seen whether they become an export crop. Therefore, it does not appear likely at this time that European oil mills will be able to obtain any volume of soybeans to crush in the near future, unless they are imported from the United States or possibly Manchuria.

The availability of other oilseeds is also not too promising. Prewar imported peanuts were obtained from French and British West Africa, India, China and Manchuria. French West African production may be somewhat larger this year, but exports will be materially below the prewar volume. British West African peanuts are somewhat below the 1935-39 production level and are all reserved for the United Kingdom. India's production has decreased somewhat and domestic consumption has increased leaving only an insignificant quantity for Europe. It is possible that small quantities may be obtained from China but availability from Manchuria appears doubtful. It is of interest to note that the United Kingdom is undertaking to develop a new area of peanut production on an extensive scale in East Africa and hopes to produce with mechanized equipment 600,000 tons in the year 1950. The purpose is to develop a source of raw materials for the British oilseed crushing industry and to conserve foreign exchange. The French government is also making plans to modernize and increase peanut production in its African Colonies.

As to the flaxseed, European countries formerly obtained their supplies from Argentina, Uruguay and India. At the present time Argentina and Uruguay are crushing their own seed and selling only linseed oil and meal. This policy is not likely to be changed as long as the importing countries are forced to buy oil and meal from them. India is also adopting this same policy. Therefore, it appears that Europe will import but little flaxseed in the near future.

Most of the European countries will be able to obtain limited quantities of oilseeds. The Netherlands will be able to crush copra from the Netherlands Indies. Belgium will have palm kernels to crush from Belgium Congo and France will have some peanuts from French West Africa. All the European countries are receiving some Philippine copra. The volume of oilseeds for crushing in 1948 may be somewhat greater than the small volume this year, but the rate during the next few years is not expected to increase materially.

HOW MANY SOYBEANS WILL WE EXPORT?

How many bushels of American soybeans will be exported during the next few years? I do not know. It is evident that European countries will desire to obtain American soybeans for some time. Canada, the Philippines and several other areas are interested in securing small quantities. Even General MacArthur wants American soybeans for feeding the Japanese. The quantity that foreign countries will purchase naturally depends upon our price and the price for which oilseeds and oil and cake can be procured from other areas.

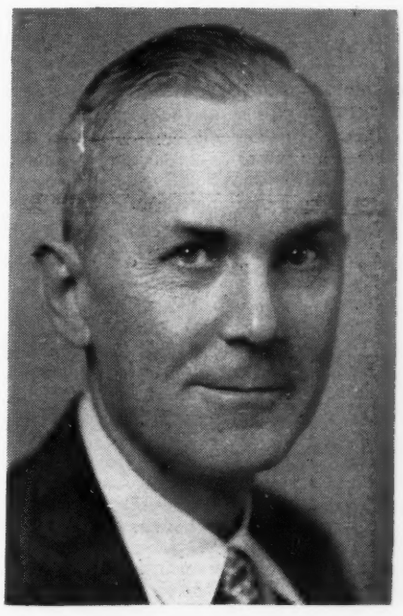
There is another factor, however, that appears to be more important in the immediate future; namely, the extent to which foreign countries have dollars to pay for their soybean imports from the United States. As has been indicated, several countries have already notified the United States that they must limit their expenditure of dollars to only the most essential items. Undoubtedly practically every foreign country will soon be in the same position. As long as the unfavorable balance of trade continues, this country will be unable to export all the agricultural commodities it may have for sale. It will be necessary for the United States to import goods from abroad in much greater volume if we wish to export soybeans in any quantity over an extended period.

The United States authority for export control continues in effect until the end of February 1948. Therefore, the government must decide between now and then how many soybeans, if any, can be spared for Europe and other areas from the 1947 crop. The quantity of protein feed supplies as well as the quantity of vegetable oils required to maintain our own economy will naturally influence the government in deciding the volume it will permit to be shipped abroad. Our short corn crop this year will increase the demand for protein feeds and will be an important factor in determining whether all our soybeans from the 1947 harvest should be retained in this country.

In summing up the situation for the next few years there is no question that the foreign need for American soybeans will be great. It is evident that many crushing mills abroad will operate only part time for years to come. The "$64 question" is, How large will the effective demand be? The method of aiding Europe under a Marshall plan has not been worked out, but we are already committed to help rehabilitate many of these countries. The shortage of dollars abroad, however, will continue to be an outstanding factor in limiting the quantity of soybeans most foreign countries will be able to purchase.

Other Countries Want Our Soybeans if They Can Find the Necessary Dollars. But These Will Be Scarce Abroad in Next Few Years. Author Is of USDA's Office of Foreign Agricultural Relations.

FRED J. ROSSITER



SOYBEANS AND FOREIGN TRADE POLICY

By WHEELER McMILLEN

YOUR program committee has proposed that this topic shall be discussed here from all viewpoints. They realized that the price of world peace concerns the members of the American Soybean Association considerably more than the price of soybeans.

Nothing that any one individual, any one group, or any one nation may do can be expected by itself to insure a durable peace on this turbulent planet, or even peace in our time. However, I do not believe I overestimate the seriousness of your concern when I venture to suggest that soybean producers would gladly promise to conduct their business at cost for 10 years, or even at less than cost, if anyone could guarantee that such an action would contribute definitely to the peace of men on earth.

In that spirit let us examine the philosophy and actuality of the reciprocal trade agreements and their history. They were conceived by men of good will, men imbued with a doctrinaire and dogmatic belief that by reducing tariffs they could promote the international exchange of goods and thereby improve the welfare of humanity. That was a noble hope, one which decent men everywhere like to believe they share.

* * *

Two great needs confront this disordered postwar world.

The first is order. Without effective, responsible and fairly honest governments there can be no orderly society. Seeking self-preservation in a disorderly society, men will not venture far to produce or to trade.

The second need, which can hardly be filled before order is established, is production. Nation after nation is short of food and clothing and essentials of living, short of capital machinery and, having in a few years destroyed the savings of centuries, short of capital itself.

Needs and wants are universal. They exist everywhere. All men want food, clothing, shelter, and some of the better things of life.

Production to supply these needs, on the other hand, is to some degree localized. Coal, iron and other minerals are unevenly scattered around the earth. The forests no longer grow where the houses must be built nor where the printing presses consume their product. Thousands of miles separate the wheat lands from the supper tables of the people. Particularly in Europe, not only distance but international boundaries intervene between the supplies and the needs. Consequently international trade is necessary to human comfort.

* * *

The United States stands unique among civilized nations in the abundance it produces and in the variety of that abundance. We have within the borders of our land the ability to produce more than 90 percent of all our requirements.

Even so, the United States must trade with other nations. Some of the commodities which we cannot produce are indispensable to the economy which we have built up, and therefore must be obtained from other nations by exchange. More than that, we are able to produce some things in excess of our requirements. It seems desirable to sell these excesses abroad and thus avoid the necessity to curtail their production.

Still another consideration demands that Americans shall trade with other nations. The standard of living of our people rests not upon dollars but upon goods. Whenever Americans can advantageously improve their supply and variety of goods by importing from elsewhere they are adding to their real wealth and to their standard of living.

* * *

No other country is so fortunate. No other produces so great a variety of goods, nor produces so abundantly.

This very fact places upon the United States of America, now when most of the rest of humanity suffers in poverty, an obligation which transcends the ordinary considerations of narrow national interest. The broad and true national interest of Americans lies, as it never has before, in promoting the prosperity and well-being of people everywhere on earth. Americans, indeed, seem to have indicated that they are willing to go even further than to promote the prosperity of others. They are willing to share at their own expense the abundance they can produce here.

* * *

The American soybean industry produces two commodities of foremost importance—a vegetable oil with scores of uses, and a vegetable protein that also is extraordinarily versatile. Large as the industry has grown, neither it nor its co-producers in these two fields can supply all the vegetable oils and proteins which Americans have found ways and means to consume.

WHEELER McMILLEN

The United States is the best market the earth affords for vegetable oils. Naturally those who produce such oils, whether from the coconut, the palm tree or any other source, look first at their chances to sell their oils here. The trade route of least resistance leads normally to the American market.

As members of the soybean industry, then, you are confronted with a decision. Will you, in the supposed interests of world welfare and peace, consent to share this great market, which your imagination and energy have helped to develop, with the poorer countries who seek American dollars? Or will you stand on what may seem to be the purely selfish position that you are entitled to preference in your own markets?

* * *

Some aspects of this problem have not, it appears to me, been sufficiently ventilated in the light of present conditions. For instance, who stands in the greatest *need* of the vegetable oils of the Pacific, of Africa and of the Orient? Is it the American people, already rich by comparison and abundantly supplied? Or is it the war-bruised peoples of Europe, the poverty-laden millions of Asia, or perhaps the very populations in the Pacific and Africa and the Orient who produce those oils?

Will Americans really be unselfish if they say, "Sure, we have lots of fats and oils, more than anyone else in the world. But we can use some more. We have industrial products to sell you—so send on your oils."

That is what will be said, in effect, if agreements are made which invite the import here of great quantities of vegetable oils. Naturally the oils will seek this market first. The oils that come here will not nourish the children of Europe nor feed the populations of Asia. On the other hand, if they are not encouraged to flow to the United States, they will necessarily seek outlets in countries where they are more needed. The trading will not be quite so lush, but much of it will be accomplished.

What, then, is truly selfish? That question may deserve far more exploration than it has received.

* * *

Americans realize that to help the less fortunate peoples to help themselves is the wisest and most generous of all possible international policies. Does it help others to help themselves if we open our markets more freely, or does it merely help to entrench the producers of other areas more deeply in their poverty?

What country and what region has ever enriched its producers and workers by fastening upon them a one-crop or one-product system and requiring them to work for whatever that product will bring in a competitive world market? Has sugar raised the standard of living for the field workers in Cuba? Has rubber

enriched the plantation workers of Malaysia? Has tin made comfortable the miners of Boliva? Has copra improved the lot of the Pacific island natives? Has palm oil made West Africa a market for automobiles? Did the American South ever enjoy genuine prosperity while more than half of its agricultural effort was devoted to cotton?

Almost no country or region has ever built a comfortable living standard so long as it centered production efforts upon any one single commodity for sale in world markets. Every country that has been able to abandon that policy has seen the living standards of its people rise. Sugar and cotton, tin and rubber and copra have made millions for imperialistic exploiters and have enriched thousands of traders and shippers. They have seldom done more than to provide the barest necessities, and not much of those, to the original farmers and laborers.

To open wide the American market for the world's vegetable oils, then, may be expected to fix upon the peoples of distant lands chains of monopoly from which they shall not be able to escape and out of which they will derive no popular prosperity. Such a course will not help them to help themselves.

What, then, is the far-seeing, wise and unselfish course? Shall we exploit the cheap labor of distant lands in order to provide cheap raw materials and cheap luxuries for ourselves? Or should our policies help them to diversify toward abundance for themselves.

* * *

The negotiation of reciprocal trade agreements employs the tremendous bargaining power of the United States to influence the fiscal policies of smaller and weaker nations. To the United States government customs duties are a smallish matter, producing less than 10 percent of the public revenue. But Brazil and Sweden and China depend upon the customs for around half of all their government income. The percentage in Latin America runs from one-fourth in some countries to 88 percent in Guatemala. India relies upon these duties for 70 percent of its income. The fiscal systems of all nations these days are in situations delicate enough. Is it wise, then, for a powerful America to bludgeon weaker countries into trading deals that may make their internal economics still weaker?

* * *

The trade agreement proposals were enacted into law back in 1934. It was argued that they would reduce unemployment. Yet 10 million Americans were still hunting jobs 5 years later when our belated preparations for war solved their problem.

It was argued that the agreements would help to prevent war. We have had both trade agreements and war, while the fears of war have not diminished.

Countless evils have been charged against what are falsely called the high-tariff and trade-barrier policies of the United States. I have yet to hear a single proponent of the trade agreements point out or even admit the fact, known to every fair-minded student, that fully 65 percent of all the imports brought into the United States enter free of duty and have done so for a quarter of a century. Nor do men who discuss this question seem generally to understand that among the approximately 60 trading nations of the world, around 50 impose more and higher tariffs and trade barriers than does the United States.

To Open Our Doors to Vegetable Oils of Other Lands Will Only Fix Chains of Monopoly Upon Their Peoples, Says the Editor-in-Chief of Farm Journal. Solution Is to Help Backward Countries to Diversify.

Whatever hopes may survive in this world at the door of the second half of the twentieth century are hopes that center upon the American people and upon the United States of America. Here and here almost alone in a darkened and hungered world does human freedom stand a chance to survive. From here and here alone is there a chance that the contagion of freedom may again spread to revitalize the human race.

With that overwhelming fact staring us in the face, no one needs to emphasize the necessity that the United States must keep and increase every fiber of its strength, economic, military, political and moral. That strength has all its roots in freedom. The sole insurance for continued freedom is production, production abundant and versatile.

For military reasons alone, the United States must continue to keep in business the producers of every kind of strategic material. High on this list of materials are the vegetable oils and the proteins. For economic reasons the balances of production must be maintained, so that no one portion of the population and no one region of output shall be crippled or put at disadvantage. For the most selfish considerations of self-preservation this nation cannot afford to impoverish a single township nor a single farm. At the same time, for the most unselfish considerations in behalf of all humanity, the United States cannot afford to weaken itself in any part. Even on the narrow sector of international trade, we must not forget that the most prosperous peoples have the most to offer, have the most numerous wants, and can therefore do the greatest amount of trading. Only short-sighted and ignorant statesmen would propose that we make some of our people poor in order to import materials we do not need when, if all our people are prosperous, we shall be able to enrich ourselves and others too by importing far greater quantities of things that we do need.

Neither, may I add here, should Americans consent to participation by their officials in the creation of government cartels, called international agreements of any kind, which bind this government to restrict the production or allocate the markets of American food or goods.

* * *

Your committee has invited me to present to you an opinion and a viewpoint with reference to the position the soybean industry should take toward reciprocal trade agreements. I have by no means exhausted the subject nor have I touched upon all the pertinent facts. I have sought to urge that you do not permit yourselves to be influenced by false theories, by false statements, nor by the false phrases of propagandists, nor by the clouded thinking of confused economists.

I urge you, in plain words, to have the courage to be reasonable. None of you wants protection that is prohibitive or unfair. You would like to stay in business. You fear that you may be called selfish. So what? Is it selfish to want to survive? Is it selfish to want to contribute to the strength of your United States? Is it selfish to advocate a policy which, although it happens to favor your own interests, can be shown to promise more humanitarian results the world around than an opposing policy which could destroy your own interest?

These are times when words are used as weapons. Often they are unfair weapons and frequently they are dishonest weapons. These are times that demand of leadership the acumen to penetrate the unfair and dishonest meanings, the fair-mindedness to assess issues on facts rather than on words, and the courage to do the right thing even in the face of being misunderstood and misrepresented.

I hope you will stand for what you believe to be right. I hope you will oppose the illusions and delusions on which the reciprocal agreement program is built. I hope you will have the courage to take a stand that will help producers overseas to help themselves, that will oppose both the exploitation of foreign workers and the exportation of American jobs, and that will protect the strength of our own ideal of freedom in the United States of America.

—s b d—

JOINS GUILLORY CO.

W. Jack Crutcher is a new associate of Guillory Sales Co., Memphis, Tenn., brokers. He was with the Wesson Oil & Snowdrift Co. for 18 years, and spent most of the war years on loan to the fats and oils branch of the War Food Administration.

LET'S HAVE FREE TRADE
in Vegetable Oils

By LAWRENCE WITT
Michigan State College

LATE in 1946 and early in 1947 most business forecasters were expecting a sharp but brief economic recession in the latter part of 1947. Some thought evidences would begin to appear as early as July while others did not expect it until after the harvest. Up to now there has been virtually no evidence of such a decline in business activity; in fact, inflationary influences still appear to be dominant.

Business forecasters now are pointing to two items as principal reasons why their forecasts have not yet been realized. One is the extremely unfavorable weather this spring and its effects on corn and other spring grains and on the size of the spring pig crop. The second is the unprecedented volume of exports from the United States. Exports of goods and services in May were at the rate of nearly 20 billion dollars per year. June figures were somewhat lower. Such a figure is hard to visualize. It means more if we say that this is the equivalent of more than 5 weeks production of every gainfully employed man, woman and child in the United States. We are devoting 10 percent of our efforts to producing for export markets.

This tremendous foreign market appears to have been sufficient to defer the predicted recession for some time. How long depends in part upon how long the dollar credits of foreign countries hold out. How can we provide foreign countries with dollars so that they can continue to purchase our goods in volume and help keep our factories producing and our agricultural products moving to profitable markets? Freer international trading is the only permanent solution.

MUST BE PART OF LARGER PROGRAM

Before I discuss this problem in more detail I want to clarify the position I have been asked to present to this meeting. *I cannot conscientiously support a program for free or freer trade in vegetable oils unless it is part of a comprehensive program for reducing restrictions on international trade for a large number of agricultural and industrial products both here and abroad.* Economically the American consumer would gain from unilateral tariff reductions on the part of the United States. However, the present pattern of international political maneuvering and ideas of national self-sufficiency appears to require that U. S. tariff reductions be used to bargain for the easing of trade restrictions on the part of other nations. The growing shortage of dollar exchange throughout the world and the predominant role which our economy plays in world business places us in a strategic position in such bargaining. It is to our broad economic and political interest to make greater concessions to other countries than we receive, provided that we do receive material concessions. The continuance of present political and economic rivalry sets the stage for a third World War.

RECENT EXPORTS

During the 12 month period ending July 1, 1947 we exported over 600 million bushels of grain. We are shipping wheat and flour abroad at a rate of more than 10 times larger than in the thirties. During 1946 we sold abroad about a third of our cotton and tobacco crops. We exported 174 million pounds of soybeans and 85 million pounds of soybean oil. Automobiles, trucks, nylon stockings, women's clothes, chemical and other industrial products ranged around 5 and 10 percent of our production. In some industries the proportion is much greater. We are exporting about 5 tons out of every 100 tons of coal produced.

Obviously many of these exports are emergency exports and will decline as Europe and Asia develop their own production potentialities. Yet it does provide an opportunity to realize the stimulating effects which export markets of this magnitude have on our business and agricultural activity.

It is estimated that over 3½ million workers depend on export markets for their jobs. Consider for a moment the effects on our markets and purchasing power if export markets disappeared and these workers were unemployed or consider the effect on our agricultural markets if instead of using 700 or 800 million bushels of wheat and exporting the rest, we had to use the entire record crop of 1.4 billion bushels, and had to do it not only in 1947 and 1948 but also 1949, 1950 and so on. The American market, enormous though it is, cannot utilize the entire output of our agricultural and industrial plant. Export markets play a vital part in our economy.

Drastic readjustments in our levels of production would be necessary if we had to depend on domestic markets alone. At least a third of our wheat, cotton and tobacco acreage would be abandoned or turned to other uses, such as corn, soybeans, animal production, or fruits and vegetables. Many of our industries would have to cut back production schedules, perhaps not immediately but certainly with time. Domestic purchasing power would decline and might even throw us into a depression. Yet developments now in the making suggest that many of these adjustments will have to be made unless we can find a way to safeguard a permanent foreign market for a large volume of agricultural and industrial products.

Commodity Groups Should Not Be Allowed to Hamstring the Public Interest. Individual Risks in Freer Trade Are Small Compared to the Possible Gain of a Stable World Order. Dr. Witt Has Made a Long Study of International Trade.

GROWING SHORTAGE OF DOLLARS

During the war, South America and some other areas accumulated a backlog of dollars from our heavy purchases of war supplies—tin, rubber, copper, nitrates, manganese, wool, petroleum, fibers, hides, etc.—as well as from the greater volume and higher prices of the usual export commodities, such as sugar, coffee, cocoa, and certain oils and waxes. They were unable to spend all these dollars because of the emphasis on war production in the United States and other industrial countries. Other nations accumulated smaller dollar balances from U. S. preemptive buying, and from expenditures of the United States government and Army personnel. Additional dollars were made available by various foreign loans of the Export-Import Bank, direct loans such as the British loan and by various other private and public loans.

The dollars obtained during the last 7 years are rapidly being dissipated. Already Great Britain, Sweden, Mexico, Brazil, Argentina, Peru, to mention only a few, have taken steps to further reduce and regulate imports from the United States so as to limit purchases in the U. S. to the more essential commodities. Canada will soon face similar problems. These measures are being forced on these countries by circumstances; it is not part of an anti-United States policy. They have no choice in the matter so long as their imports from the United States so greatly exceed their exports to the United States.

What can we do to limit the development of such programs? What can we do to maintain a large volume of export trade, thus helping to maintain our business activity at a high level and keeping our domestic purchasing power high. A short run answer is to continue to make foreign loans both public and private. By maintaining a reservoir of dollars available to foreign countries they can continue to purchase from us. But this is simply another form of deficit spending. The loans ultimately must be repaid or forgiven.

In the long run, a phrase which we economists like to use, we must trade goods for goods. We may loan dollars abroad so that foreigners can buy our wheat, cotton, tobacco, oils, automobiles, typewriters, drugs, chemicals, etc., but if the loan is to be repaid we must accept goods from them, paying for these goods in dollars which are then used to repay the loan. Normally we exchange automobiles for coffee; typewriters for tropical oils; wheat for perfumes, petroleum and other foreign specialties; cotton for silk and wool; tobacco for fine china; rice, airplanes and automobile tires for crude rubber; etc. Dollars enter on both sides of the transaction but are really nothing more than the lubricant which keeps trade flowing smoothly. Tourists may buy food, rent hotel rooms, use transportation or buy the trinkets tourists buy. The dollars they spend are returned to the United States in payment for our exports of various agricultural and industrial goods.

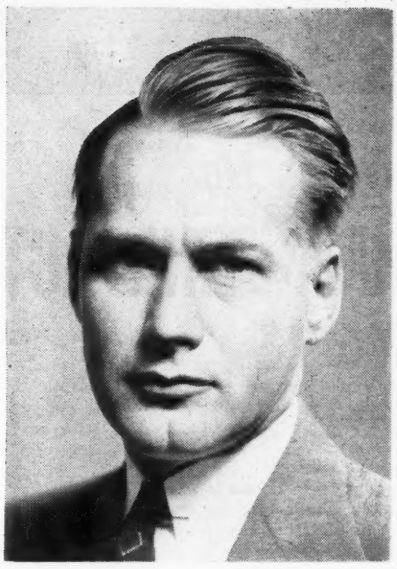
I am sufficiently hard-headed to want to get something back for the products we now are sending abroad and which are being partially financed out of taxes you and I are paying. I could easily use an English tweed or two. My wife would like some French perfumes and oriental silks. We would both like some English and European bone china. Our children could use a few toys and trinkets similar to those we imported before the war. Our yard, when we find a reasonably-priced house, would be improved by several hundred tulip bulbs from Holland. I think most of the people in this audience would like to do the same thing. Instead of pouring our wheat, tobacco, automobiles, soybeans and soybean oils and other products down a rat hole, I'd like to have a large volume of these foreign products coming to the United States. And they will come in quantity if we put our international trade on a free basis. It is the only permanent way to insure a large volume of export trade.

BARRIERS TO IMPORTS

There are many barriers to an increased volume of imports. Today a principal barrier is the small amount of foreign goods available to us regardless of price. But as the world economic situation is stabilized, more and more goods will become available. Our tariff barriers and import quotas will then be the major hindrance to an expansion of trade. Reduction or elimination of these trade barriers would materially assist in establishing international trade on a solid and permanent foundation. In most cases it will not be as disruptive to the American economy as would be sharp downward adjustments in all export sales.

Our economy is so big relative to the rest of the world that an import item representing only 1 or 2 percent of our production might well represent the major export of some foreign country. We might use coffee as an example. We purchased about 470 million dollars worth of coffee in 1946, representing 10 percent of our imports but less than 3/10 of 1 percent of our national income. Yet these purchases made coffee the major, or one of the two major exports of 10 Latin American countries as well as several African colonies. The functioning of the economies of these countries is dependent upon our continued purchase and use of large quantities of coffee.

It is not difficult with this background



LAWRENCE WITT

of the world situation to obtain agreement within any one commodity interest group, vegetable oils at this meeting, that international trade ought to be carried out on a much freer basis than at present provided that it is agreed at the outset that our special commodity is not to be molested by tariff cuts and greater competition. But the difficulty is that when specific proposals are made each commodity interest group prepares to defend its interest to the last ditch. The general interest of the entire country which should be paramount usually is lost in the fray. At least such has been the experience of the United States on tariff policy during the last three decades.

We are in a position to compete with the rest of the world in growing and manufacturing a wide variety of products. I believe that soybeans are one of these, but we are in danger of losing the opportunity of producing these goods for which we are preeminently suited because other groups are afraid or unable to face competition from outside sources. We consider ourselves the finest example of free competitive enterprise in the world but we favor that free competition only within certain limits. International tariffs and trade restrictions of course are only one of the many barriers to free competition.

SOYBEANS IN WORLD TRADE

Turning now more specifically to soybeans. Are they more likely to be helped or more likely to be under competitive pressure if international trade restrictions are removed? To answer this question it is necessary to discuss certain aspects of the competition between various fats and oils of both animal and vegetable origin. Before delving into this complex subject it is desirable to review a few salient features of soybean growing in the United States.

The production of soybeans expanded rapidly during the twenties and thirties. The replacement of horses by tractors led to a decline in oat prices and its replacement by soybeans in the rotation throughout the heart of the Cornbelt. Soybean oil meal found a ready market in livestock rations as farmers improved their feeding practices, while the oil went into industrial markets competing with cotton seed oil, linseed oil and various foreign produced oils. Industrial processes for utilizing soybean oil improved considerably. In fact they are often cited as an outstanding example of chemurgic development. During the thirties the combine harvester, improved varieties of soybeans, and the generally better knowledge by farmers of best production methods operated to increase our efficiency of production.

NO BENEFIT FROM TARIFF

Norway, Sweden, Denmark, Canada and other countries purchased soybeans in the United States as the best and cheapest source of supply. The 2 cent per pound tariff on soybeans meant nothing to our farmers, since we were selling on the international market at international prices. They received no tariff protection on soybeans.

The oil separated from these beans in these purchasing countries competed with coconut oil, palm oil, palm kernal oils, linseed oil, and other foreign produced oils in these foreign markets at their prices, even though these same oils had to pay a tariff before competing with soybean oil in the United States. Moreover even soybean oil was exported, though in smaller quantities and primarily to Cuba, to compete more directly with these foreign oils abroad. However, it is possible that soybean oil processors received some small benefits from the tariff but it is clear that only part if any of the 3½ cent per pound tariff was received as tariff protection.

Within the United States soybean oil is used as food in products such as margarine, shortening, etc., and as an ingredient of various kinds of soap, paints and related products, and in a number of miscellaneous uses. It competes with butter, lard, cottonseed oil, linseed oil, coconut oil, castor oil, inedible tallow and grease, fish oils, palm oil and a host of minor oils. Certain of these fats and oils such as lard, tallow and to a lesser extent cottonseed oil are by-products of meat and fiber production. Total production of these products is not directly related to the price of oil. Soybeans produce both oil and protein feed. About half of the value of the soybeans comes from oil and about half from oil meal. Recently the proportion from meal has been somewhat higher than before the war because of the relatively higher prices for protein feeds. Oil of course is worth much more per pound but only about 17 percent of the original weight of beans is extracted as oil. The heavy use of protein feeds in animal production in the United States is an important asset to United States soybean producers.

COMPETITION OF OTHER OILS

Among the foreign oils a group of lauric-acid oils and olive oil are imported for use in certain highly advertised soaps. It is unlikely that tariff rates or prices will have much effect on the minimum quantities used. The olive oil imported is of a type which enters free of duty. Beyond these quantities the competition between various domestic and foreign oils is strong. Let me point out the areas in which I believe the competition will be keenest. The immediate future for fats

(Continued on page 53)

Progress Under the RESEARCH AND MARKETING ACT of 1946

By E. A. MEYER

THE KEEN interest which you of the American Soybean Association have in research makes it particularly pleasant to appear on your program. When I look at the rapid strides which your industry has made in recent years I realize that you have good reason for being research conscious. I checked the Department of Agriculture's figures before leaving Washington and found that soybean production in the U. S. since 1924—when the Department started keeping records on soybeans—has increased 40 fold! Any industry which expands that fast is bound to develop a lot of growing pains which need research attention.

The list of questions which you have for the research worker is further lengthened by the fact that the chief use of soybeans has shifted in recent years. In 1924 the chief use of soybeans was for paints and varnishes. Although that use has increased and many other important industrial uses have been added, the real expansion in soybean consumption has been as food—in shortening, cooking oil and margarine.

Much of this production expansion and shift in uses has taken place during the war years when non-military research facilities were necessarily curtailed.

During the war, world shortages and the resulting good price of fats and oils brought above average returns to our producers. Neither efficient production nor superior quality products was necessary for good incomes. Contrary to some war expanded industries, you seem to have no false hopes that this situation will continue. The effort which other nations are making to increase their fats and oils supplies is shown by the recent announcement that the British government was setting up a corporation to encourage widespread peanut production in Africa. If a great number of palm tree plantations should be started in the South Pacific, as they were after the last war, the future world oil supply would be still further increased. So if large-scale soybean production is going to continue in the United States you must be ready to meet stiff competition. That is another good reason for your widespread interest in research.

BREATHING SPELL

It is fortunate from your perspective that world production of fats and oils will probably remain short of demand for a number of years. This will give you a brief breathing spell in which to solve some of these problems. But there is no time to spare.

Certainly there is every reason to believe that soybeans *will* continue as one of our important crops. The soybean is one of the most versatile of farm products. It provides valuable food, much needed livestock feed, and is important for many industrial uses. A great many farmers are geared to soybean production. There is now a large soybean crushing plant, and marketing channels are well developed. All these things point to soybeans as an important cash crop in the United States for years to come.

My part on your program is to give you a review of progress under the Research and Marketing Act and indicate what assistance you can expect from us in helping solve the problems of the soybean industry.

HOLDS HOPE FOR BETTER LIVING

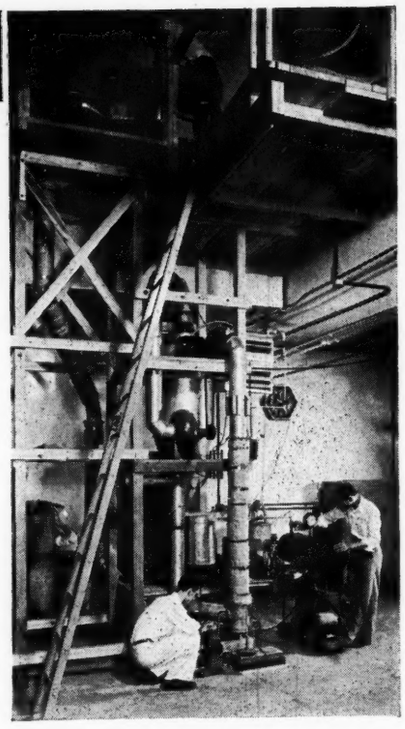
I tell you frankly that I am enthusiastic about this Act. It can mean a lot to our farmers, to the processors and distributors of farm products and to the consumers of the nation. Agricultural research is an attempt to bring increasing scientific and economic knowledge to bear in solving the problems faced by the agricultural segment of our economy, and holds great hope of better living for all of us.

As to what the Act provides, let me say that basically it provides for no new types of research. I need not tell a group of soybean producers and processors who know the work of our Peoria laboratory that research of the Department of Agriculture has for some time extended all the way from crop production to the discovery of new uses for farm products. Major emphasis, however, had been on production research. We had very limited funds for marketing and utilization work.

The great significance of the Act lies in its scope and emphasis. It states that one of its purposes is to bring research and services in the marketing and utilization of farm products up to a position of parity with research in farm production. It provides for much broader teamwork between the research activities of the federal government, the states and private industry. Finally it envisions a greatly expanded program. It authorizes new appropriations that step up year by year to a level of 61 million dollars in 1951.

As you know, however, the authorization of funds by Congress does not mean that the funds will be actually appropriated. This Act was passed in August 1946. It was not until July 30, of this year that the first funds were made available. Instead of appropriating the 19 million dollars authorized for 1947-48, Congress voted 9 million dollars.

These funds for the current year are divided in the following manner: 2½ million go to the state experiment stations to be used for all types of research; 1½ million goes to USDA for cooperation with state agencies on all types of research other than utilization; 3 million dollars goes to the Department for utilization research; and 2 million to the Department for marketing and distribution research and services.



An experimental pilot plant of Central Soya Co., Inc.

The year which has intervened since the passage of the Act has been devoted to building a program, so that when funds became available, there would be the least possible delay in beginning operations.

First off we had the job of conferring with interested groups over the nation, getting them informed as to the contents of the Act and soliciting their cooperation and their ideas on the most effective ways of carrying it out.

We began formalizing this producer-industry consultation in October with the appointment of a National Advisory Committee. Shortly thereafter a Committee of Nine was appointed representing the directors of the state agricultural experiment stations, to confer with the Department on federal-state cooperation.

Following recommendations of the National Advisory Committee, we then set up 19 commodity committees and a committee on transportation. The job of these committees was two-fold: First, to outline fields of research which they felt should be undertaken on their subjects; and second, and more important, to indicate the priority which they felt should be given to these various fields of research.

To aid them we set up working groups in the Department corresponding to each of the specialized committees. These working groups brought together the thinking of the Department as to research needs in each field and presented it to the committees as a starting point for their deliberations.

Representatives of state departments of agriculture and state experiment stations were also named on the working groups. However, cost and distance prevented most of them from participating except by correspondence.

All of these specialized committees have

met and made their recommendations, and the National Advisory Committee has met four times.

Additional working groups in the Department reviewed problems of commodities not covered by advisory committees, and outlined the research and services needed in many fields besides transportation which cut across commodity lines. Meanwhile, Department and state agencies were developing their own proposals for specific projects.

Thus, by the end of June we had program materials from the advisory committees, the working groups, the Committee of Nine, various state agencies, and agencies within the Department, as well as suggestions from private organizations and individuals.

This has involved a lot of conferences and a lot of work, but we have looked upon it as a two-way educational process. It has aided us immensely in building our program and at the same time helped inform interested public groups as to the nature of the Act and our progress under it. We feel that this has laid the ground-work for some fine cooperation between farmers, industry, and the federal and state governments.

Out of the wealth of material accumulated through this process we forged a program for the fiscal year 1948. This was reviewed by the National Advisory Committee in June and revised in light of its recommendations and the amount of funds made available by Congress.

Here are some of the program policies which we have decided upon: We believe that projects should represent new lines of activity within the various fields of work, or activities where substantial expansion is clearly needed. We believe that the research should be practical—that it should deal with problems which producers and industry face now or will face in the immediate future. We want our work to yield results which can be immediately put to profitable use. We intend to concentrate our efforts so as to do an effective job in a limited number of fields rather than scatter them over a multiplicity of different problems.

Here Is a Preliminary Outline of the Soybean Program to Be Undertaken Under the Much-Heralded Research and Marketing Act, by Its Administrator.

E. A. MEYER

MARKETS TO COME FIRST

Finally we want to make the first order of business the finding of new and expanded markets for those crops which now or in the immediate future threaten to be in surplus. We feel that the Department's emphasis can best be placed on marketing and utilization research, leaving major responsibility for production research to the states.

Now let's turn to the work of the soybean and flaxseed advisory committee. Members of that committee representing your industry include J. B. Edmondson, the vice president of this association; Otto G. Brandau, D. J. Bunnell, Karl Nolin, H. F. Carpenter, Eugene D. Funk, and Harry Traux. Two other members of the committee, R. W. Capps, and Howard Kellogg, represent processors of both soybeans and flaxseed.

This is an exceptionally fine group of men, and they are rendering a very valuable service. I should mention that all the members of these committees—except persons on the national committee who had to make several trips to Washington—have paid their own expenses in attending meetings and have had no remuneration whatsoever.

Now what are the major fields of research which the soybean committee recommend that we undertake? It laid major stress on two problems: achieving *flavor stability* in soybean oil, and working out farm storage methods and facilities for soybeans so as to prevent a majority of the crop from being thrown on the market soon after harvest. The committee also gave a 1-A priority to several other problems. They stressed the need for breeding varieties which will give improved yields, will not shatter, are superior in oil content and protein qualities for different uses, are adapted to combines, resist diseases, and which are adapted to various levels of soil fertility and climate conditions. The need for developing crop rotations and other practices which will give maximum yields of soybeans and other crops in the rotation was also placed in this category, along with the need for fundamental studies on soybean protein and the development of new uses for the protein.

OTHER PROBLEMS

Among problems of a somewhat less urgent priority which cover other oils, as well as soybeans, they included the following: Better methods of processing oilseeds including use of improved solvents; a method of determining oil content of small lots of soybeans and flaxseed as delivered by farmers; analysis of the need for a market news service covering oilseeds and their products; the freight-rate structure for oilseeds and their products; the operation and effects of the futures market on prices and marketing of oilseeds and their products; nutritional and consumer-preference studies for food fats and oils, soya flour, canned and dried soybeans; and finally, a strong educational program to bring research findings to light.

Starting with the general guideposts suggested by the national committee and the specific problem-areas as outlined by the Soybean and Flaxseed Advisory Committee we had to decide just what soybean problems to attack first. In considering this question, we worked closely with representatives of the state experiment stations so as to achieve a unified plan of attack. Some of the problems recommended were already being studied—at least to a limited extent. We already have underway a big program in soybean breeding which is being carried on jointly by our Bureau of Plant Industry and 24 of the state experiment stations. There is a cooperative project between the Department and a number of the states on control of soybean diseases, which is financed by a special Congressional appropriation. A number of states are carrying on experiments to determine the best soybean rotations, and the Illinois Experiment Station has for some years been doing comprehensive research on the farm storage of soybeans.

It was finally decided that the best starting point for the Department was to intensify work on the problem of improving the flavor stability of soybean oils. Though I am not yet in a position to give you details on how this work will be approached, I know you will be glad to hear that it is being launched.

SPEED IS NEEDED

The speed with which we are able to lick the problem of flavor stability of soybean oil will greatly influence the future of the entire industry. As I said earlier, the majority of our soybeans are now used in the manufacture of food products. Soybeans have become a major source of oil for shortening, mayonnaise, margarine, and similar products. But for some strange and unknown reason such products made from soybean oil have a tendency to change their flavor after a few weeks. They do not spoil or become rancid. They just change to a less desirable taste. Unless we can stabilize the flavor of soybean oil, competing oil may to some extent surplant it as a food product as supplies become more nearly normal.

There are a number of other fields of work planned that cut across commodity lines that will be of value to your industry. Among them are:

A study to develop a method to include oil content in the grading and inspection of oilseeds;

An economic study of basic factors affecting production, prices, and consumption of fats and oils;

A number of related studies dealing with the adequacy of our present retail and wholesale market news service, of the fields into which it needs expansion, and the methods of obtaining new basic data pertaining to market supplies and movements; and

A study of the economics of oilseed processing. Though original emphasis in this latter study will be placed on cottonseed oil mill operations, we hope to broaden the work at a later date.

There will also be work on the problems of expanding consumer outlets for all agricultural commodities, of achieving greater economy in the transporting and marketing of agricultural products, and of increasing mechanization, including work on weed control and machines to apply insecticides and fungacides.

I might mention other projects, but these are the primary ones now planned which will be of direct concern to you people. There will also no doubt be studies under-

(Continued on page 54)

Soybean Research at the NORTHERN REGIONAL RESEARCH LABORATORY 1946-47

By G. E. HILBERT
Northern Regional Research Laboratory, Peoria, Ill.

DURING the past year, that is since I addressed this group at the annual convention held last year in St. Louis, the Northern Regional Research Laboratory has continued to pursue vigorously its researches on the development of new and extended uses for soybeans. Within the last year there have been two collateral developments to which I should like, in particular, to call your attention. One of these was a conference held on soybeans at the Northern Laboratory and the other was the financing of additional research on soybeans through the Research and Marketing Act of 1946.

The conference was called by the Northern Laboratory and the state agricultural experiment stations of the North Central Area. It was held at the Northern Laboratory on February 27 and 28 of this year. Dean H. P. Rusk of the College of Agriculture, University of Illinois, was chairman of the meeting. The purpose of the conference was to consider the various postwar problems facing the soybean industry, to lay plans for the solution of these problems, and to develop a long-range research program. Representatives from producers, breeders, industry and state and federal agencies attended the conference. The keynote speech was made by C. F. Brannan, the assistant secretary of the Department of Agriculture. The viewpoint of and the problems facing the grower were presented by the president of this Association, W. W. McLaughlin. Also representing the American Soybean Association were George Strayer, secretary who participated actively in the discussions, and Kent Pellett, managing editor of the *Soybean Digest*, who summarized the proceedings of the conference in the March issue of your journal. All the papers presented at this meeting have been published in the *Soybean Digest* thus permitting you to obtain a detailed picture of the meeting. This conference was extremely valuable to the research workers in the field and is aiding the Northern Laboratory in orientating its long-term research program.

During the last few months, funds have been appropriated by the U. S. Congress to finance new utilization and marketing research under the Research and Marketing Act of 1946. Proposed programs of research were submitted by various state and federal agencies to the Department of Agriculture and have been reviewed by industrial advisory committees appointed by Secretary Anderson. At this time, it appears likely that $50,000 from this new appropriation will be made available for soybean utilization studies which are to be conducted at the Northern Laboratory.

[1]One of the laboratories of the Bureau of Agricultural and Industrial Chemistry, Agricultural Research Administration, U. S. Department of Agriculture.

Soybean Adhesives for Shotgun Shells, a Soybean Oil Paste for Low Cost Paint, Fractionation, and Chinese Soy Sauce Are Projects Under Way at the Northern Laboratory, Reports its Director.

Tentatively we are planning to concentrate the use of this money on a fundamental study of the factors influencing the flavor stability of soybean oil. This field of work has received relatively little attention in the past from a research viewpoint, in spite of the fact that it is generally recognized to be the most important problem of the soybean oil industry. This new appropriation will, therefore, permit an intensified attack on the postwar problems facing the soybean industry.

During the past year most of the research program on soybeans at the Northern Regional Research Laboratory was devoted to (1) the development of new and improved methods for separating the oil from the seed; (2) the enhancement of the flavor stability of soybean oil;* (3) the improvement of the quality of soybean meal for the production of food products; (4) the development of new and extended industrial uses for the products of the soybean; and (5) the modification of soybean oil to increase its utilization in the paint and varnish field.

Specific examples of work or developments which I will now discuss are: oil content of soybeans maintained under commercial storage conditions; new methods for precise determination of the composition of oils and oilseeds; development of new uses for soybean protein adhesive in the manufacture of shotgun-shell casings; paints and varnishes from soybean oil; separation of soybean oil into food-oil and paint-oil fractions; flavor stability of soybean oil; translation of production of Norelac to a commercial scale; and the reduction of the Chinese art for making soya sauce to a scientific basis.

OIL CONTENT UNDER COMMERCIAL STORAGE

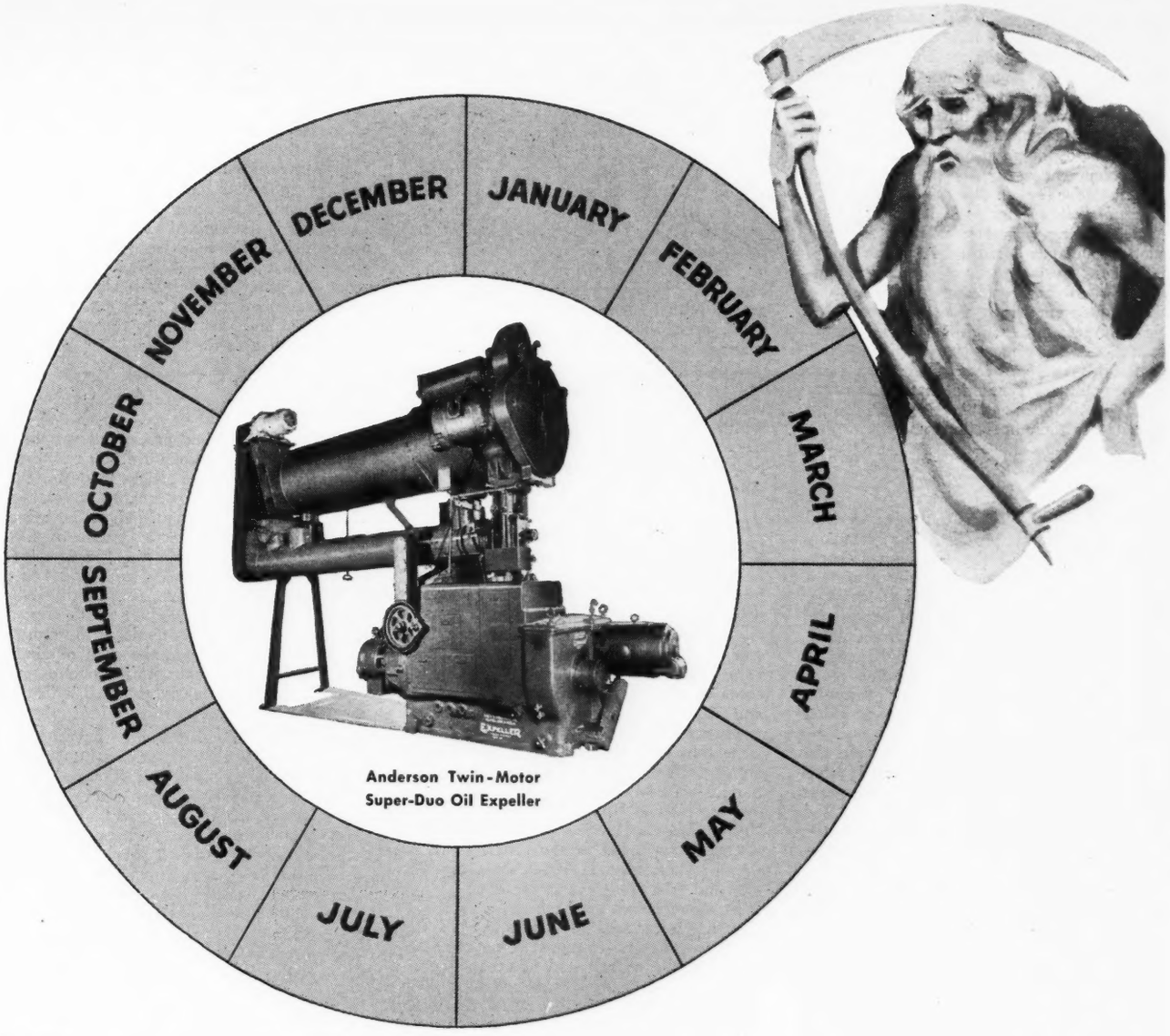
For many years some soybean-oil processing companies have believed that the oil content of soybeans decreases on storage. If this were true, farmers retaining soybeans in storage would be penalized for doing so if soybeans are to be sold on an oil-content basis as they were during the war.

In order to protect the farmer by obtaining the facts of the case, a cooperative project with the U. S. Regional Soybean Laboratory and a large industrial company engaged in the processing of soybeans was set up to follow the oil content of beans under commercial storage conditions. Representative samples of the beans from the 1945 crop were analyzed periodically by the three groups. The analytical results obtained by two of the cooperating groups checked each other. According to these results, no oil was lost by soybeans during storage. On the other hand, the results obtained by the other cooperating group indicated an appreciable drop in oil content during the first month of storage.

This cooperative experiment was repeated on the 1946 crop in order to obtain uniform data. This time the results all agreed, showing no change in oil content of soybeans during storage. These data offer convincing proof to industry that its previous views on changes in stored soybeans were wrong, particularly since a representative member participated in this investigation.

New method for precise determination of the composition of oils and oilseeds. For use in protective coatings such as paints and varnishes or as a raw material for chemical processing, it is extremely important for the chemist to know the exact composition of soybean oil, particularly the amounts of those components which are responsible for its drying characteristics. The determination of these components has always been difficult and time-consuming.

Dr. Milner and Mr. Earle of the Northern Laboratory during the past year have accumulated evidence that the methods



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now in general use are inaccurate. Careful laboratory studies have led to a marked improvement in the method of measuring the drying components of vegetable oils. These new procedures are expected ultimately to replace the older methods and lead to a more accurate determination of the quality of paint oils.

Development of a new use for soybean protein adhesive in the manufacture of shotgun-shell casings. A large cartridge manufacturing company making shotgun-shell casings explored in 1946 the possibility of developing new sources of adhesives for their casings because the price of casein which was being used for this purpose was high and the supply limited. After many experiments and trials, this company concluded that most non-agricultural synthetic materials from coal, petroleum, or mineral products were unsuited to their operations and use.

SHOTGUN SHELL ADHESIVE

In the search for an adhesive derived from agricultural products the company sought the help of the Northern Laboratory on the possible use of soybean protein as an adhesive in shotgunshell casings. Because of their background of experience on the behavior of soybean protein, Dr. Smith, Mr. Babcock and Mr. McKinney of the Laboratory were able to develop readily on a laboratory scale several formulations of soybean protein adhesives which showed definite promise.

In cooperation with these chemists, the industrial company first conducted pilot-plant runs and then full-scale plant trials to evaluate these formulations, and a large number of experimental shells were made for testing. The casings are made by rolling a special sheet of paper on a mandrel while spreading a thin solution of the soybean adhesive over the surface of the paper. The cylindrical, laminated casings are discharged from a machine at the rate of 50 to 60 per minute. The shells by shooting trials and by aging tests, which were conducted in order to determine if the shells made with soybean protein deteriorated during storage, were found to be equal or superior to those that the company had manufactured previously. In particular, the shell casings were "tougher" or more "leathery" and had better "water resistance," both characteristics being improvements in the right direction. Actual commercial use by this company of soybean protein for shotgun-shell casings was initiated in the first half of this year.

Paints and varnishes from soybean oil. Research and developmental work at the Northern Laboratory on the utilization of soybean oil in paints and varnishes has involved preparation of a large number of paint compositions along two lines. Firstly, soybean oil as a base has been modified by addition of other oils and by chemical treatment of soybean oil either to enhance its "drying" properties, or to remove from the oil those substances which retard its "drying." Secondly, the pigment of the paint has been varied by changing the proportions of white lead, titanium, zinc oxide, and lime.

These studies have shown that properly formulated soybean oil paints dry much more rapidly than was originally expected and that these paints are suitable for use on outdoor structures where some dirt collection is not objectionable and where enhanced durability is important, such as farm buildings.

By addition of lime to the pigments of outdoor white paints containing large amounts of soybean oil the paint is improved markedly. The coatings are free from both residual-tack and after-tack. Residual-tack is the sticky feel still present on the coating after being air-dried for several days, while after-tack is the softening and consequent stickiness of the coating usually caused by exposure to the heat of the sun. Both of these conditions are typical of the coatings from paints containing large percentages of soybean oil, and lead to excessive dirt pickup that cause the coatings to become unsightly and gray. With 5 percent of lime in the pigment, even 100-percent soybean oil paint coatings do not collect or retain dirt. The coatings have remained clean and white when exposed to outdoor weathering for more than a year at an angle of 45° facing south. The coatings show improved resistance to "after yellowing" when compared with linseed and soybean oil paints containing no lime.

ALL-SOYBEAN OIL PAINT

Application of the results of the work by A. J. Lewis on paint formulation led to the development, in a cooperative undertaking with the Doane Agricultural Service, of a soybean-oil paste which is now being marketed to farmers. This paste contains the proper mixture of pigments and driers which enables the farmer to produce a paint at relatively low cost merely by mixing it with soybean oil. D. Howard Doane of the Doane Agricultural Service stated in the pamphlet "Chemurgy — Progress and Promise," by Twenty-seven Distinguished Americans, that this cooperative work led to the development of the first commercial "100-percent soybean oil paint."

At a conference at the Northern Laboratory representatives of practically all the farm cooperatives engaged in the processing of soybeans solicited advice on possible future outlets of soybean oil. They were particularly interested in obtaining information on the manufacture of soybean-oil paints for distribution in their stores. This was provided to them. The results of this Laboratory are thus laying a sound foundation for the expanded utilization of soybean oil in paints and varnishes.

Separation of soybean oil into food oil and paint oil fractions. Soybean oil can be separated into two fractions, each of which is superior to the original oil for certain specific uses. A process is in the development stage at the Northern Regional Research Laboratory for making this separation possible on a commercial scale. Work on this project was initiated several years ago by Warren H. Goss. At the present time Mr. Brekke is in charge of these investigations. In the pilot-plant work completed to date, the equipment has been standardized and the best solvents have been determined for making the separation. The selective solvent is furfural, which is made from oat hulls, corncobs, or other agricultural wastes. The fractionation of the oil takes place by allowing it and furfural to flow countercurrently in a vertical tower.

STUDY OF OIL FRACTIONS

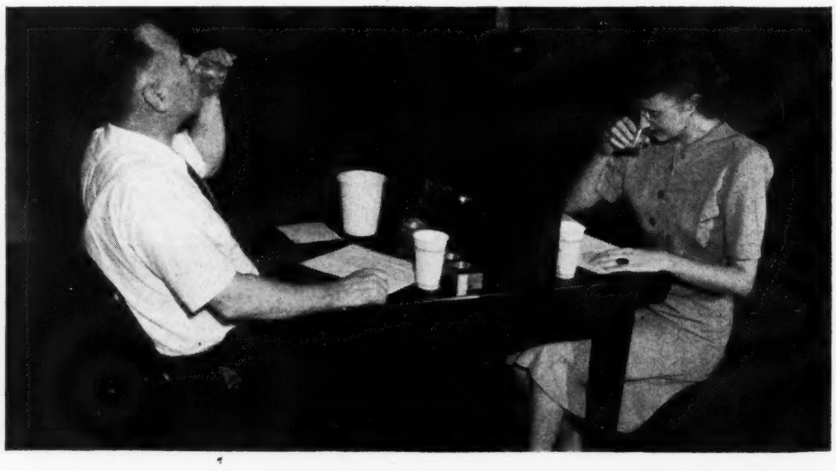
At the present time processing variables and operating conditions are being studied so that a cost estimate can be made for the process. In these experiments an extraction column 18 feet in height is being used. In previous work a column 54 feet tall was used, and at one time two of these columns, each four stories high and housed within the pilot-plant wing of the Laboratory were operated in series. As a result of improvements made in the equipment and its operation, the data obtained with the 18-foot extraction column are equal to those previously obtained with the much taller towers.

Both fractions of the oil have been studied extensively. Exterior white paints made from the fast-drying fractions were tested in comparison with similar paint formulations made from raw linseed oil. Test panels were exposed outdoors for a period of more than 3 years, and at the end of this time the paint films made from the treated soybean oil were better than those made from linseed oil.

The edible fraction was processed into a "100-percent soybean oil" shortening by one of the large shortening manufacturers and then tested in the company's experimental kitchens. The best grade of shortening ordinarily is made of about 1 part soybean oil to 2 parts of an oil such as cottonseed or peanut. Our particular shortening was adjudged a very desirable product and compared favorably with the highest grade shortening.

Past experimental results show that the process, if practical, will extend the use of soybean oil tremendously. The develop-

Two members of the soybean oil taste panel at the Northern Regional Research Laboratory, P. Burke Jacobs and Miss Mary Cox, go through their routine.



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mental work now in progress is concerned with its commercial feasibility.

Flavor stability of soybean oil. Last year at the annual convention of this Association I stated that the Northern Laboratory had initiated investigations to check the claims of the German vegetable oilseed processing industry. Their methods were reported to yield soybean oil having a long storage life. This information was obtained by Mr. Goss, who was on leave from the Laboratory and assigned to the Technical Industrial Intelligence Committee to investigate the German oilseed processing industry. Work on the German processing method has been pushed vigorously during the past year by Drs. Dutton and Cowan of the Laboratory.

USE OF CITRIC ACID

One step in the German process involved a particularly thorough degumming operation and the subsequent addition of a small amount of citric acid to the oil during deodorization. This procedure has now been tested on a laboratory, pilot-plant, and commercial-plant scale. The use of citric acid has been found to have considerable merit; that is, the storage life or flavor stability of the oil is improved significantly.

The investigation of the addition of citric acid to the oil during deodorization has been extended to include a number of related acids and other compounds. Some other acids appear to be as good as citric acid; in addition sugar alcohols such as mannitol and sorbitol have an effect similar to citric acid. These alcohols and acids appear to combine with metallic impurities in the oil and thus prevent their active participation as catalysts in oxidizing soybean oil.

It has also been found that improper or excessive heating of soybean oil in stripping columns such as are used in solvent extraction plants reduces the quality of the oil. This work involves the testing of samples of soybean oil obtained at various stages of the processing operation. These samples of oil were obtained from various members of the processing industry engaged in the production of soybean oil. This type of investigation obviously can be pursued effectively only through close cooperation with industry.

In carrying out this work, it is, of course, necessary to measure the flavor of the oil. Unfortunately chemical methods are not satisfactory for this purpose. It has, therefore, been necessary in evaluating the flavor of the oil to resort to actual taste that is, organoleptic tests. In order to eliminate the personal error, the measurement of the flavor of oil has been reduced to a systematic basis by submitting the oil to a relatively large group of experienced tasters and then arriving at the end value by statistical analysis. The procedure we have developed is a definite contribution to the method of organoleptic evaluation. Several industrial companies are adopting this procedure, thus permitting independent groups of investigators to arrive at comparable organoleptic evaluations and conclusions.

PRODUCTION OF NORELAC

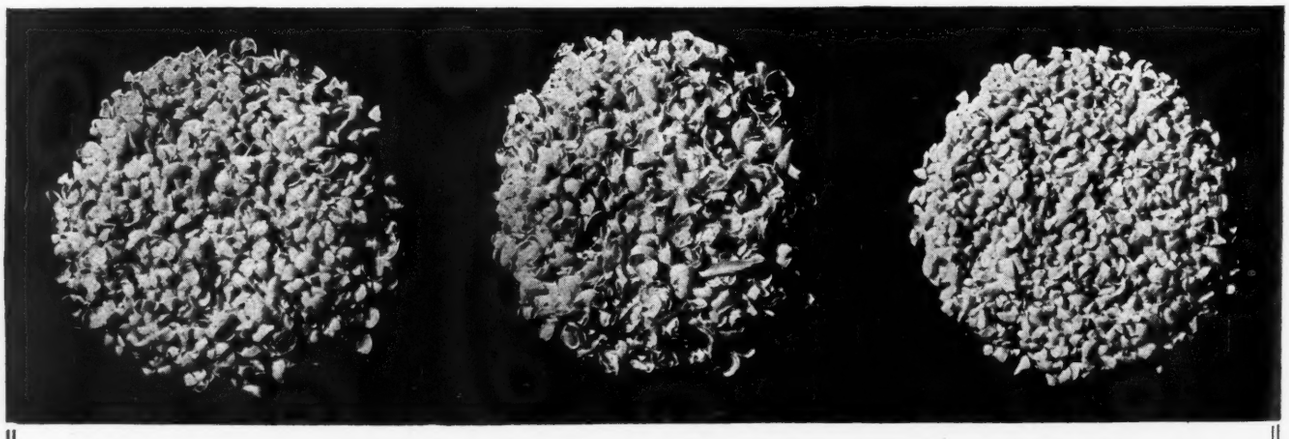
Translation of production of Norelac to commercial scale. Progress on the development of a process discovered by Drs. Cowan, Teeter and Manley for the production of the synthetic resin, Norelac, by chemical modification of soybean oil was reported at last year's meeting of the American Soybean Association. The evaluation of Norelac has now passed through the pilot-plant and semi-commercial stage. On July 1, 1947, General Mills, Inc. began full-scale commercial production in a new plant having a capacity of 100,000 pounds of finished resins per month. Norelac is used primarily as a heat-sealing agent in the packaging of foods, and in other methods for the preservation of foods. Uses for Norelac are expanding.

CHINESE SOYA SAUCE

Reduction of Chinese art for making soya sauce to a scientific basis. In China the making of soya sauce is mainly a household art, the details of recipes and the strains of ferments used in the process being handed down from generation to generation. To facilitate the translation of this art to American factory production, the Northern Regional Research Laboratory undertook a program on the selection of strains of organisms and the standardization of a process for fermentation yielding a high-quality sauce.

In this work we were aided by Mr. Pei Sung King of the National Bureau of Industrial Research, Chungking, China, who was a guest worker at the Northern Laboratory, and was obtaining experience on methods for the production of penicillin, a problem on which we were at that time heavily engaged.

As a result of this work, Dr. Lockwood found that excellent soya sauce could be made by a brine fermentation of the



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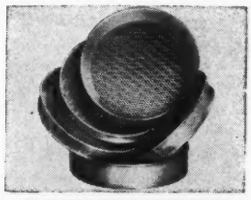
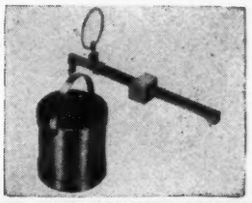


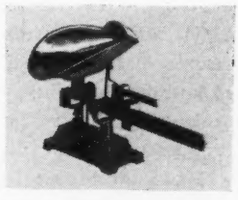
DOCKAGE SIEVES

Both precision and commercial grades available, made from heavy aluminum, 13" diameter, 1⅞" inside depth. Write for complete listing of perforations available.



WT. PER BUSHEL TESTER

Hand type tester, ruggedly made yet permitting sharp, clear readings. Available in pint to 2 quart sizes with precision made bucket guaranteed to contain accurate volume of test material.

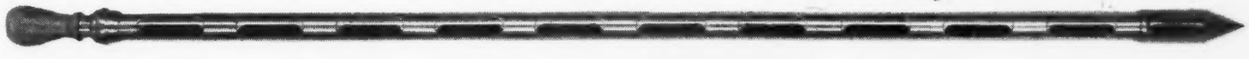


No. 550 SCALE

An all-purpose scale designed for making weight per bushel tests, dockage tests, weighing samples for moisture tests, etc. Heavy gauge aluminum pint cup. Scoop made to pour easily.

TAG-HEPPENSTALL MOISTURE METER

This moisture meter offers a rapid and reliable method of determining the moisture content of grain. Calibrated against air-oven method for grain, and the water oven method for corn.



SEEDBURO GRAIN PROBES

Illustrated is one of several models available, all made of heavy brass for long life, all conform to government specifications. Indispensable for proper sampling.

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beans lasting from 30 to 90 days. The "starter" used in this process is a mixture of three previously prepared cultures: (1) a combination of two molds that develop on cooked rice, (2) a yeast working on soya broth, and (3) a bacterial fermentation of soya broth. For a quality product these should be mixed at the right stage of development in suitable proportions.

Strains of four organisms were found to be desirable in preparing soya sauce, and these have been added to the permanent collection of industrial ferments at the Northern Laboratory. These include two molds, a yeast, and a bacterium. These are being maintained in pure cultures and are being made available to industry. This makes it possible for an industrial company to engage in the production of soya sauce and for the producer to make fresh start with new and pure cultures, if at any time his stock cultures become contaminated with "wild" molds or yeasts that injure the quality or uniformity of his product.

The details of this work are being reported in an article by Dr. Lockwood which will be published in an early issue of the *Soybean Digest.*

SUMMARY

The magnitude of soybean production has made research into the industrial utilization of the crop of paramount importance, and has brought the Northern Laboratory into close and active cooperation with federal and state agencies and with industry. The Laboratory has shown that no oil is lost from soybeans during their storage prior to processing, thus settling a moot question among buyers and processors.

A new use for soybean adhesives has resulted from formulations prepared by the Laboratory at the request of an ammunition manufacturer for use in making shotgun-shell casings, commercial use of the adhesive having started in the first half of 1947.

The Laboratory's studies on soybean-oil paint formulations have resulted in great improvement in such paints for outdoor use.

There also was developed a soybean-oil paste containing the proper mixture of pigments and driers which enables farmers to produce a paint at relatively low cost by merely adding soybean oil to it.

A process in the developmental stage at the Laboratory for separating soybean oil into two fractions, each of which is superior to the original oil for certain specific uses, has resulted in a superior paint oil and an edible oil suitable for shortenings of highest quality.

Norelac, a synthetic resin made by modification of soybean oil and developed at the Northern Laboratory, for use as a heat-sealing agent went into full-scale commercial production in July, 1947.

A method for the fermentation of soybeans by a combination of molds, yeasts, and bacteria has been found to give a reproducible soya sauce of excellent quality. Strains of the microorganisms are now being made available to industry from the Laboratory's culture collection.

—s b d—

WILLARD

(Continued from page 33)

a burden of weeds to control in the soybeans.

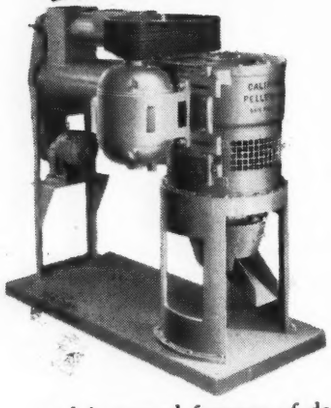
This will be especially true as the use of 2, 4-D in corn becomes more important as a means of control for deep-rooted perennial weeds. Last year we sprayed a patch of field bindweed in corn with 2, 4-D in August after the corn was in the milk. No injury resulted to the corn, but this year the bindweed is practically eliminated. It will not be that simple west of the Mississippi, but even there, field bindweed can be struck a severe blow by using 2, 4-D in corn in the late summer.

Pre-emergence treatment of corn fields with 2, 4-D is an exciting new method of controlling annual weeds in corn which promises to be very practical. This also, will reduce the problem of controlling weeds in the soybeans following the corn.

If 2, 4-D is a valuable pre-emergence spray for corn, what about using it as a pre-emergence spray on soybeans? We do not know. It certainly has possibilities. Even more certainly, it has serious hazards. Soybeans are very susceptible to 2, 4-D. Those of you who were on the field trip the first day saw several examples of pre-emergence treatment of soybeans, most of which were not too good. For the present, we simply cannot recommend this treatment.

Another new method of weed control in soybeans is flame weeding, of which you saw some excellent examples on Thursday. It is too early yet to say what the future of flame weeding will be. As with the rotary hoe, timeliness is an essential factor in its use. Used at the right time, well adjusted, it can be very effective. It is yet to be demonstrated that flame weeding can compete economically with other cultivation methods for soybeans, or, indeed, for any crop in the Cornbelt, but it is well worthy of further intensive study.

Here is the California Pellet Mill



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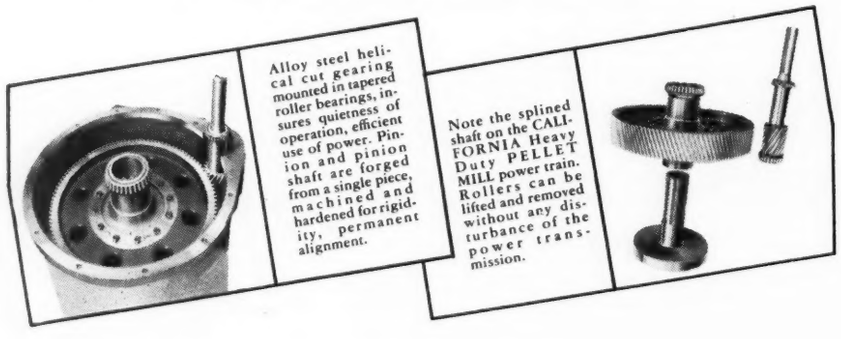

Alloy steel helical cut gearing mounted in tapered roller bearings, insures quietness of operation, efficient use of power. Pinion and pinion shaft are forged from a single piece, machined and hardened for rigidity, permanent alignment.

Note the splined shaft on the CALIFORNIA Heavy Duty PELLET MILL power train. Rollers can be lifted and removed without any disturbance of the power transmission.

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Send for bulletin No. 701 describing the new CALIFORNIA Heavy Duty PELLET MILL.

TWO GREAT MILLS FOR EVERY PELLET SIZE AND SHAPE

PRESENT STATUS OF SOYBEAN DISEASES

By J. LEWIS ALLISON

IN 1945, additional funds were made available by Congress to the division of forage crops and diseases of the Bureau of Plant Industry, Soils and Agricultural Engineering, U. S. Department of Agriculture, for soybean disease research. Since that time considerable progress has been made on the knowledge of soybean diseases.

As the Cornbelt is the major soybean-producing area of the United States, first consideration was given to organizing the work in that region. Dr. W. B. Allington, plant pathologist, was assigned to the new project in the fall of 1945. Dr. Allington formerly had been plant pathologist with the U. S. Regional Soybean Laboratory. His new assignment placed him in charge of the soybean disease work for the division of forage crops and diseases. He retained his headquarters at Urbana, Ill., where he works in close cooperation with the Illinois Agricultural Experiment Station and the staff of the Regional Soybean Laboratory. Since early 1946, he has had the able assistance of Dr. Donald W. Chamberlain who works with him on the numerous soybean disease problems being investigated.

Other centers of investigation have been established in cooperation with the state agricultural experiment stations and agricultural colleges of the Midwest at the following locations: Columbus, Ohio; Lafayette, Ind.; Ames, Iowa; Columbia, Mo.; Madison, Wis.; and St. Paul, Minn. Various diseases of soybeans important in these states are being studied by trained investigators.

The U. S. Department of Agriculture Is Developing an Efficient Organization to Cope with Any Threatened Outbreak of Soybean Diseases. The Author Is Senior Pathologist at Beltsville, Md.

J. LEWIS ALLISON

A second major soybean-producing area is the South, especially the Delta Region of Mississippi, Arkansas, and Louisiana. A coordinating center for the soybean disease work in the South has been established at the Delta Branch Experiment Station, Stoneville, Miss., which is also the headquarters of the work of the Regional Soybean Laboratory in the South. Dr. Howard W. Johnson acts as the coordinator of the soybean disease work in this area. As in the Midwest, other centers of investigation have been established at the following locations: Beltsville, Md.; Raleigh, N. C.; Experiment, Ga.; and Baton Rouge, La. At these points diseases of soybeans in the respective areas are being studied.

The over-all coordination for the entire soybean disease program is supplied from the national headquarters of the division of forage crops and diseases at Beltsville, Md., by Dr. J. Lewis Allison, who is in charge of the project on forage crop diseases. We now feel that our soybean disease research is on a very sound and logical footing and that qualified personnel have been employed to make possible a very thorough attack on the soybean disease problems as they occur in the major soybean-producing areas in the United States.

MANY DISEASES ARE PREVALENT

Although no widespread disease epidemics were observed or reported on soybeans in 1946, reports on nursery plantings and disease surveys indicated that many diseases were prevalent in the major soybean-producing areas and caused appreciable losses in some sections. With favorable conditions prevailing over a wide area of our major soybean seed-producing areas, an epidemic of one of the more serious soybean diseases, or a new disease, would undoubtedly seriously affect the soybean crop. As with other crops, diseases constitute a constant menace and therefore continued vigilance and research are essential in preventing serious losses and in maintaining maximum production of soybeans.

Had we not developed an organization such as we have to cope with the various diseases known to attack soybeans, a serious disease problem might arise at any time. For example, the brown stem rot trouble of soybeans was first recognized in the fall of 1944. Growers attributed the trouble to early frost in the region where it occurred. However, when our pathologists started to investigate, they soon learned that the trouble was caused by a fungus parasite. Studies were initiated immediately to learn what the causal organism was and how best it could be controlled. It was not long before they had learned that brown stem rot was caused by a fungus heretofore not known to attack soybeans.

This fungus now has been properly identified and much is known of its habits and life cycle. It was found that continuous cropping with soybeans favored the development of the fungus and if such practice was broken by a means of other crops in rotation the disease did not seriously attack soybeans when they were replanted on infected areas.

This illustrates how well our soybean disease investigations fit into the whole picture of soybean production and, as stated earlier, because we have a well coordinated organization located at key points throughout the country we hope to keep abreast of soybean diseases as they appear.

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RESEARCH AND CHEMURGY

V. S. Peterson and his display of chemurgic products.

AMERICA has made 50 years of progress in 10 years by taking its inventors out of sheds and attics and putting them in modern research laboratories backed by ample funds, V. S. Peterson, central-western district manager of the Du Pont Co.'s extension division, told the convention.

"The whole story of our economic system, which has produced by far the highest standard of living the world has ever known, is bound up in this process of logically gathering ideas and transforming them into products that benefit consumers," he said. His subject was "Research and Chemurgy."

The process, he went on, is both complicated and difficult, and many people and groups of people have a hand in it.

"All of them," he said, "are members of a team—research workers in many different fields, engineers, designers, tool-makers, administrators, investors, and workers. If any one of these groups falls down, the others might as well not have succeeded, for the ultimate consumer doesn't get the product."

Mr. Peterson described the process through examples, showing how rayon, nylon and the plastics field had expanded into industries making jobs that had never existed before for thousands of people, while at the same time raising significantly the standard of living of the average American.

"When John Wesley Hyatt invented Celluloid, he made jobs for hundreds," Mr. Peterson said. "When Baekeland invented Bakelite, he created jobs for thousands. But organized research in the plastics field created jobs for tens of thousands."

The speaker showed representative samples of various stages of development in the plastics industry, including some so new as to be still in the experimental stage.

EVERYBODY GAINS BY SHARING

"The reason for this advance? Somewhere back along the line, they learned that everybody would gain if science, labor, and capital got together, first, to share the risks, second, to share the problems, and third, to share the benefits, too."

Mr. Peterson showed his audience a hypodermic needle, which, in 1935, was the only equipment that existed for making nylon. He also held up a filament of nylon.

"What you see in my two hands," he said, "was the nylon industry in the year of 1935. This hypodermic needle was the plant. This filament was the product. Seven years of time and a fortune in money had been spent in bringing nylon to this point. Of course, there was a formula, too, some chemical data on paper. But that was the industry."

He described what happened after that, with textile technologists, engineers, physicists, metallurgists, cost accountants, and production and marketing experts moving in. He told how, in 1938, almost 11 years after the beginning of research, Du Pont announced the invention of nylon. Also how during the past year a new process of making one of the bases of nylon from furfural coming from corn cobs, oat hulls, etc., was perfected.

Mr. Peterson, showing dozens of new chemical products, used them to document his thesis that the American standard of living was raised both from the point of view of expanded employment and of more and better things at lower prices for all consumers by the teamwork of many groups.

"It is the consuming public, after all, that determines which developments are brought to market," he said, "and it is the consuming public which decides how far developments shall progress."

"The consumer, under the traditional American system determines the types, the size and the extent of enterprises. If an industry cannot satisfy the public as to the utility, quality and price of its products, it becomes a dead mouse overnight. Thus it is the public which has assured progress."

Cellophane, Mr. Peterson pointed out, first introduced in 1925 as a product without a market, has developed to the point where hardly a shopping trip is completed without the purchase of one or more articles wrapped in one of the many types now available, each tailored for some specific job of display or protection.

HOW PRICES COME DOWN

The plain, transparent type when first produced was priced at $2.65 a pound; today a greatly superior product sells for 35 cents a pound. During 20 years, more than 30 successive price reductions have been made voluntarily, although the material continued without a competitor in the transparent wrapper field.

Among other products of research and development included in his presentation were cellular cellulose acetate, a light-weight, strong core material; rayons; cellulose sponges; coated fabrics; and "Duco" finishes, the cellulose base lacquer used in painting most automobiles; which cut the finishing time for cars from 20 days to less than 20 hours.

"Duco" metallichrome nitrocellulose lacquer, exhibited as the most recent development in automotive finishes, combines a remarkable depth of color, an unusual brilliance of luster, improved ease of maintenance, and superior durability.

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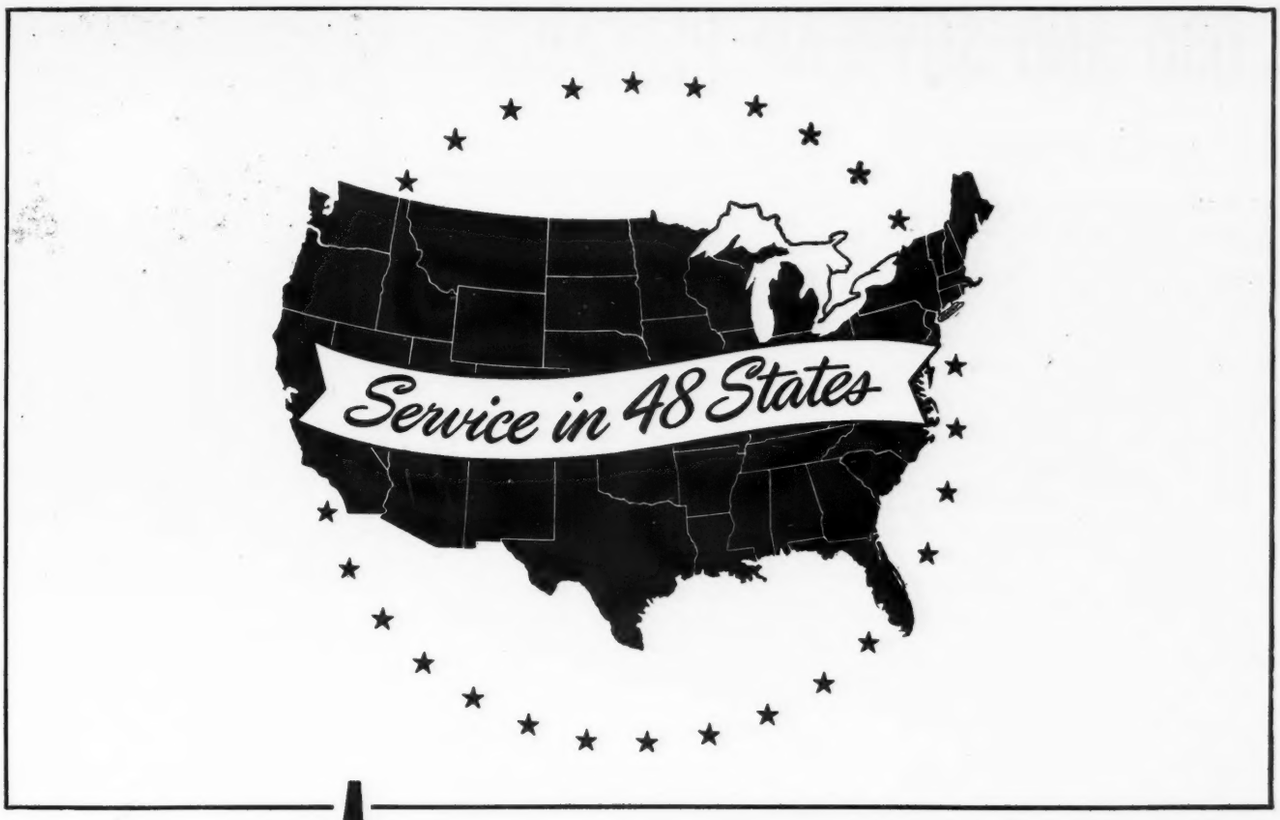
Solvent Process

Roach 44% Soybean Oil Meal

Roach Soybean Oil



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And there are four additional reasons why you can come to Amsco with confidence . . .

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4. *Amsco offers a full line of varied extraction solvents to meet the needs of your particular job.*

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OSU AND SOYBEAN RESEARCH

By L. L. RUMMELL

GREETINGS to you who have travelled widely, from some 25 states and seven foreign countries. We welcome you to Ohio and to Ohio State University.

We have here in Columbus the fourth largest University in America with more than 27,000 students anticipated this fall. There will be about 2,600 in the College of Agriculture with more than 2,000 boys in Agriculture, the others being girls in The School of Home Economics.

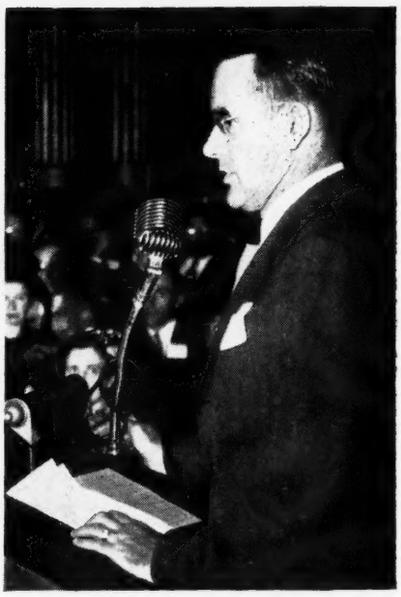
Ohio is the fourth largest soybean state with a little less than 20 million bushels. Northwest counties are the principal growers.

At the Ohio State University you saw extensive experimental plot work in field crops, a large portion of which is devoted to soybeans: varieties, fertilizers, crop rotations, weed control, methods of planting, etc. Even more research is in progress at the main experimental farm of the Agricultural Experimental Station at Wooster, 90 miles northeast, and in addition we have 15 outlying farms.

In addition to field trials with soybeans, the Ohio Station has for many years conducted extensive experiments in feeding soybeans for hogs, beef cattle, dairy cows and poultry.

During the war years the soybean farmer made a notable contribution to victory. All farmers did in fact, for we soon found that food was just as essential as material of war and that farmers were essential to winning the war. Fats and oils became scarce articles and soybean production, therefore, increased immediately to supply a vital necessity to the Allied countries.

We thought for a few years that soybeans would become valuable as a human food. During those years I was associated with one of America's largest food distributors, having retail stores throughout the Midwest and South. We tried to sell soybeans in every form—bread, flour, canned, sprouts, roasted, crackers—and I must say we have not yet found the soybean of important commercial value for human food. Some customers like canned soybeans, and most people enjoy the cocktail wafer. Otherwise, the products are slow sale with few repeat orders. This does not discourage us, necessarily, about possibilities of soybeans for human consumption. They do have wide acceptance in Oriental countries, but American tastes are different and we have a greater variety of foods here.



L. L. Rummell, dean of agriculture at Ohio State University.

This then is a challenge to the grower and processor in developing a bean that will satisfy the taste of the American consumer as a canned bean and processed by the miller will produce a bread and a cracker that will attract the taste of millions of customers. There is exceedingly high food value in the soybean, as we have found with livestock and as the chemist finds in his laboratory. The average American, though, still buys his food largely by impulse and by eye appeal and repeat orders largely by taste without studying nutritional values. We need a soybean, therefore, that will retain this high nutrition and combine a taste that satisfies the homemaker and her family.

There is still a great field open in research in other aspects of soybean culture. Thus far the economic phases have naturally received primary attention. Fundamental physiological studies need to be made. The field is still relatively new to the plant breeder, although already he has made notable progress in improved varieties. The processor, too, is interested in methods of handling the crop, making greatest economic use of the beans for livestock use, for human consumption, for oils, for plastics and other uses.

We here at Ohio value our relationships with processors, merchandisers and industry working in cooperation with us in our research and educational institutions. We have financial grants from our growers and processors, as well as several from individual firms. We have the personnel and the facilities for research here in our university and experiment station. Industries have a desire to cooperate in a common problem. They add their practical counsel as well as their money. Such cooperation in any industry leads to progress and we encourage it.

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WITT

(Continued from page 39)

and oils is bright. World production in 1947 is still about 20 percent below prewar. Population meanwhile has increased. However, looking somewhat farther ahead as production of butter, lard, coconut oil, palm and palm kernel oil is restored to something like prewar levels, it appears that increasing price competition will be felt. If at that time tariff concessions on vegetable oils have been made it would seem that the competition would be hardest on the following fats and oils: linseed, foreign fats and oils competing with tung oil, and lard.

FLAX MAY DECLINE

Flaxseed production for linseed oil in the United States and Canada is likely to decline. If wheat prices are still favorable downward adjustment will not be difficult for growers. A qualification on Argentina must be mentioned. So long as the present government maintains current price schedules and price policies, Argentine flaxseed producers will not be encouraged to expand production materially for the export market.

If China gets her house in order including the present unfavorable export exchange rate, increased shipments of tung oil may be expected. The effect will be felt primarily by other foreign oils and by linseed oil.

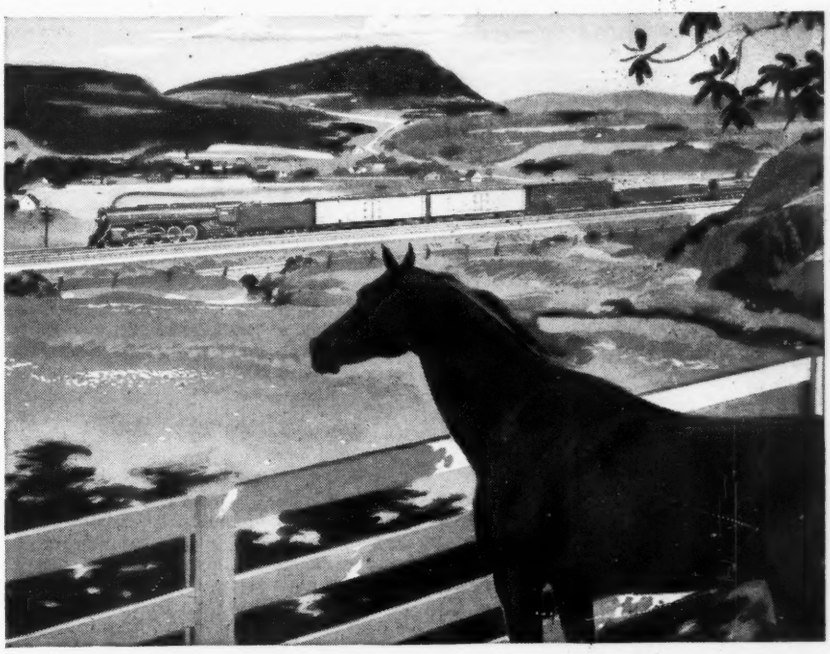
Lard is likely to undergo the most serious readjustments. Before the war considerable quantities of lard were used for soap, in considerable part because trade policies abroad reduced our export sales of lard materially. The result was to greatly depress prices of heavy hogs relative to hogs weighing 180 to 200 pounds. Considerable attention was and is being given to the development of a meat-type hog producing a larger proportion of meat and being sold at not over 200 pounds. Increased interest in this type of hog is likely as fats and oils become more plentiful and regardless of possible tariff concessions. If the production of this hog becomes widespread, and there are sound economic reasons for directing more feed supplies into meat production, a considerable supply of American produced fats will be removed from the market. Vegetable oils, domestic and foreign, will fill the gap.

Production of certain other fats and oils now at high levels may be reduced as price readjustments are made throughout the entire economy. Whether these are substantial or minor depends upon the level of national purchasing power. Soybeans belong in the latter group whose major problems lie in the level of national income. Increased imports of tropical oils may weaken the market but movements in the general level of business activity are far more important. This is particularly true since soybean oil meal which is used at home constitutes the major by-product of soybean oil.

MEAT IMPORTS WON'T INCREASE

Realistically we cannot look forward to any material increase in meat imports. In fact the incidence of the hoof and mouth disease in Mexico may well reduce imports below prewar levels. The remaining supplier, Canada, is consuming a greater proportion of her production. As we are forced to produce virtually our entire meat supplies for our increasing population within our borders, intensive feeding practices utilizing high protein feeds, will be necessary. Soybean oil may become a by-product rather than a joint product with soybean oil meal, but it is not likely that any reduction will be required beyond what would probably be good conservation and farm management practices. It should also be remembered that the main international markets for soybeans are Canada and the healthier European economies, the Netherlands and Scandinavian countries.

Before concluding I want to mention a major problem which I have not emphasized up to now, namely the political aspects of our tariff and trade policies. Throughout the world before the war and continuing after the war individual nations were attempting to protect their own producers, at least in those which were not thoroughly disorganized by the war. Internal political pressures and the necessity of guarding their balance of payments have combined to make a large measure of self-sufficiency almost a universal goal. The public interest of the United States in strong economic and political ties with western Europe, South America and the far East should not be hamstrung by the interests of a few commodity groups. Our statesmen need a freer hand in negotiating to counter the world trend towards nationalistic programs. While the returns of such policies are not assured, the risk of individual loss to those interested in soybeans is small and the gains from greater national and international purchasing power are great. The possible gains from a more stable world order are immeasurable.



Where Does the Iron Horse Get its Oats?

Your railroads need investment dollars just as much as a thoroughbred needs oats.

Investment dollars nourish research and invention, improvements in plant, equipment and service — the life and future vitality of your railroads.

But to attract these investment dollars, and to finance improvements needed to serve you better, the railroads must have reasonable earnings.

Most folks think 6% is no more than reasonable. Last year, however, railroads as a whole earned an average of only 2¾% on their net investment. Many railroads actually lost money. And this year, even though hauling a record peacetime traffic, American railroads will probably average only about 3%.

Why are the railroads faced with this situation? That's simple. Since 1939, wages have climbed more than 50% . . . costs for materials and supplies are up 60%. At the same time, the average charge for hauling a ton of freight a mile is less than 15% above 1939! Railroads are still hauling freight for less, on the average, than any other comparable transportation in the world!

Any business should earn at least 6% if it is to continue as a progressive, self-supporting enterprise. The railroads are no exception.

Doesn't this strike you as fair and sound . . . and to *your own* best interest in the long run? *Association of American Railroads, Washington 6, D. C.*

AMERICAN RAILROADS

THE NATION'S BASIC TRANSPORTATION

MEYER

(Continued from page 41)

taken by the state experiment stations which will deal with soybeans.

After plans for this year's program of federal and state research are completed, I anticipate that we may discover problems deserving priority treatment which—in spite of our careful planning—have been overlooked. Furthermore, there may be new problems arising in the course of the year which merit immediate attention. We have set aside a portion of our funds—a reserve—to take care of such eventualities. If you know of problems which you feel fall in either of these categories, we would appreciate your calling them to our attention.

To round out this picture of soybean research let me say a word about the third partner which is sharing in this work—that is the soybean industry itself. In spite of the fact that most of your industry's growth has taken place in very recent years—and war years at that—you have already done much valuable research work. I think this work should—and will—expand in the years ahead. The job of the government under the Research and Marketing Act is not to take over your research function, but rather to do for farmers and the processors and distributors of farm products those things which they cannot do for themselves and which—if done—would strengthen American agriculture.

It seems to me that one of the most important contributions which we can make under this act is to point up the major research needs in agriculture and then act as a coordinating office in channeling all available facilities into the solution of these problems. For example, our work in bringing leaders of the soybean industry together to ferret out the widespread research needs of the industry is in itself a major step forward. We hope to do more of that in the future.

HELP GROUPS PULL TOGETHER

But helping industry formulate an up-to-date statement of research needs is only part of this job. We face a still bigger task of acting as an integrating unit in helping the various independent groups which have a contribution to make, best utilize their resources in the solution to these problems. This means coordinating the work of the various agencies within the Department of Agriculture itself; it means coordinating federal work with that of the states; and finally it means integrating federal and state work with that of industry. When you remember that this research work is going on in various agencies of the 48 states, in numerous bureaus of the Department and in Department laboratories scattered throughout the nation, and finally in the many complex industrial and other nongovernmental institutions—you begin to realize the size of this job. It is a job we cannot do by ourselves. But if you, and the other groups I have mentioned want to do this job, we can spearhead it and act as a central clearing house of information.

To me one of the most essential elements of the assignment—and one of the keys to the whole success of the Research and Marketing Act—is in the establishment of a solid basis of government-industry cooperation. And by industry, I mean everyone concerned with agricultural products from the farmer to the distributor. Our job is to serve you and we can serve you properly only if we have a close working relationship. That is why we went to industry at the very beginning to find out what their needs were. That is why I welcome opportunities like this to meet with industry leaders and discuss the work.

In conclusion, let me say that I am fully aware of the active support given by the American Soybean Association in the passage of this legislation and the appropriation for it. We hope that through cooperation with you we will achieve such results as to merit your continued support.

—s b d—

MANLEY

(Continued from page 27)

acids from soybean oil can be modified for use in rubber, lubricants, synthetic resins, special soaps, pharmaceuticals, cosmetics and perfumes, molding compounds, insecticides, roofing pitches, waxes and floor polishes, plasticizers, adhesives, buffing compounds, flotation agents, dyestuffs, paper and lubricating greases, linoleum, oil cloth and printing inks.

There are, of course, many other specialized uses for soybean oil, some of them well established, others in an experimental stage. Before the war, soybean oil was used as a core oil in iron, steel and nonferrous metal foundaries; as an aid in textile and leather processing and in grinding and cutting oil compounds. As the country returns to postwar normalcy, these industries should again use significant quantities of soybean oil.

At the same time, new applications, developed during the war years, will offer additional outlets. One such application is the polyamide resin now being manufactured commercially by General Mills, Inc. This product, which was originally formulated by the Northern Regional Research Laboratory and developed commercially by the research laboratories of General Mills, is formed by dimerizing soybean oil fatty acids and then reacting them with a chemical known as ethylene diamine. It is a tough, heat-resistant plastic used as a water-vapor proof sealer or surface coating for paper, as a laminating agent, as a protective coating for wood and metal surfaces and in many other applications. Since polyamide resin possesses a combination of properties not found in any other single material, it has potential uses in a long list of specialty products, products which will solve many industrial problems.

It is on such developments as this that I base my optimism concerning the future of soybean oil. Because of its dual personality—its "in between" nature—it has few limits other than man's imagination. and that imagination, working under the stimulus of free enterprise, has proved itself both vigorous and resourceful.

—s b d—

AWARD TO JULIAN

Dr. Percy L. Julian, director of research for the soya products division of the Glidden Co., recently was awarded the Spingarn Medal for distinguished service to his race.

Dr. Julian, one of the country's leading organic chemists, is the grandson of an Alabama slave and the son of a railway mail clerk. Now 48 years old, he is famous for his developments in soybean chemistry.

Perhaps Dr. Julian's best known contributions to medical science are his discoveries of a drug for controlling the pupils of the eyes and of a method for large scale production of female and male hormones. used in the treatment of expectant mothers.

In his work for the Glidden Co., large producer of paints, varnishes, foods, and countless other products, Dr. Julian directs a large staff of highly trained chemists at the soya products division laboratory in Chicago.

In accepting the Spingarn award which was presented by Dr. Harold C. Urey, noted atomic scientist, Dr. Julian said: "The sacred responsibility of the American scientist is to hold out to the world the hope of peace and to chart the way to that peace out of the lessons of science."

Financing Your Soybean Inventory

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RESEARCH ON SOYBEANS[1]

● *"We cannot all think alike amid the dilemmas of a changing world. Nor is it right that we should. Opinion striking against opinion ignites the spark that can kindle the lamp of truth" . . .*

— KING GEORGE VI

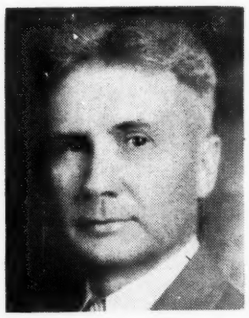
By W. L. BURLISON and C. M. WOODWORTH[2]

THIS QUOTATION is not given to suggest that there is a conflict of opinion among experiment station workers regarding the phases of soybean production to be investigated, but rather to suggest that the problems and needs of our widely scattered states are varied and divergent and that they themselves thus account for the wide variety of researches being undertaken.

On March 14, 1936, a "list of the currently active research projects concerned with soybeans at the several state agricultural experiment stations was compiled in response to action taken at the organization meeting of the Soybean Council, held December 5, 1935 in Chicago, Ill." This list of projects was brought together by Henry H. Steece, senior experiment station administrator, U. S. Department of Agriculture.

W. L. BURLISON

In this first report on soybean projects in this country, 206 titles are listed. At that time five states only were indicated as not doing research of any kind on soybeans. Our outlying possessions, as Alaska, Hawaii, and Puerto Rico, had a few active projects. The 1936 report was revised as of May 20, 1937. This report listed 249 active projects — an increase of 43. A third revision of soybean projects of the experiment stations was released February 1, 1944. This revision included 401 active studies on soybeans, an increase of about 150 during a period of 8 years (1937-1944). As a basis for this brief discussion we have used Mr. Steece's 1941 report. On February 5 of this year Mr. Steece sent us a partial revision of the 1944 outline of soybean projects. A few projects have been dropped or made inactive. So far as we can determine now, the number of active soybean projects stands at about 370, a decline of 30 titles. It is doubtful if this represents a decline in research on soybeans but, rather, a revision and regrouping of projects for greater efficiency and better coordination. Publications growing out of these projects would help to indicate the particular problems being investigated, but time does not permit us to go that far into the subject today.



C. M. WOODWORTH

If we classify soybean research studies by departments, the list stands about as follows:

Agronomy	193
Animal Husbandry and Dairy Husbandry	135
Horticulture	25
Chemistry	17
Home Economics	17
Botany, Physiology, Ecology	13
Agricultural Engineering	8
Entomology	5
Pathology	5
Bacteriology	4
Agricultural Economics	3

This list does not include any USDA projects; hence, cannot be taken as a complete catalog of investigations in the United States. However, many state projects are noted as cooperative with the USDA.

ANOTHER CLASSIFICATION

A second classification based upon the various problems encountered in producing and using soybeans on the farm is as follows:

1. Testing varieties—adaptation, maturity: 2. breeding—selection, hybridization; 3. diseases; 4. insects; 5. soil type (topography): 6. seedbed preparation; 7. time of planting: 8. method of planting—solid drilling vs. in rows; 9. amount of seed per acre; 10. inoculation; 11. cultivation; 12. physiology-ecology; 13. place of soybeans in the rotation; 14. soil treatment; 15. harvesting—for hay and seed; 16. storage of seed; 17. farm utilization—feeding; 18. edible purposes—green vegetable, sprouts; 19. cost of production; 20. marketing; 21. soybeans and soil conservation; 22. industrial utilization—oil and other products.

Since the shift in the center of soybean production from the southeastern states to the Cornbelt, there has been a very large

[1]Soybean Conference—Northern Regional Research Laboratory, Peoria, Ill., Feb. 27-28, 1947.
[2]Ill. Agricultural Experiment Station.

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increase in research on many phases of this crop.

A careful study of soybean projects indicated that they may be divided into two main groups on the basis of number of times the projects are listed by the various states. One group includes those phases that occur frequently, and the other group includes those that are represented by relatively few projects.

I. *Phases or Problems Being Investigated by Many Stations*—The testing of varieties is one of the commonest projects, there being 42 of them. Varieties differ greatly in maturity, lodging resistance, tendency to shatter, as well as yield, and all the stations need tests to enable them to answer questions about varieties and make recommendations to farmers. There were also 27 projects on breeding soybeans. These likely have to do primarily with selections, although we know that many states are making and studying hybrids.

There is much interest in soil treatment studies as evidenced by the fact that 44 projects were listed under this heading. Higher yields have been much sought after, especially during the war period. High fertility levels have been found in general to give high returns but soybeans have not always responded to certain soil treatments as have other crops. Also, results are sometimes inconclusive and conflicting.

Probably no phase of soybean research is receiving more attention than cropping systems or rotations which include soybeans. Forty-two projects were recorded under this heading. Like soil treatment studies, much more work will be required on rotations. No single topic is more frequently discussed than the effect of soybeans on the soil. This important line of activity should be greatly expanded along with investigations on soybean management practices in relation to erosion control. The Soil Conservation Service is very active in trying to clear up the problem.

RESEARCH ON FARM USAGE

Research having to do with the utilization of soybeans on the farm has expanded enormously during the last 10 years. About 120 specific projects are listed in this category, distributed about as follows: Poultry, 53; swine, 20; general, 17; dairy cattle, 13; turkeys, 9; cattle, 5; sheep, 2.

This is a good showing, but more fundamental work of this kind will be done by the stations rather than less, with the ever-increasing use of soybean meal as a high-protein feed for livestock. There is need for more information on the use of soybeans as hay, pasture, and silage.

A group of projects—29 in number—on the use of soybeans for edible purposes is now in progress. Work of this nature is expanding rapidly. The public seems to grow hot and cold on the use of soybeans for human food. Note the following: *"The soybean in itself does not sell well alone. The consuming people do not like to eat the soybean as a soybean. However, when there is a small percentage of soybeans mixed with cut-off whole kernel corn and frozen, it does make a nice product and sells relatively well."*[1]

There is not much doubt in our minds that in time, soybeans will be used to a considerable extent in the human diet. *"Changes in eating habits in which the soybean plays an important part as a green or dried vegetable and as a protein food to supplement animal products like meat, eggs, milk and cheese, have provided many problems for station research."*[2]

II. *Phases or Projects Being Investigated by Few Stations*—There are very few projects on specific phases of production such as seedbed preparation, method, date and rate of planting, and cultivation. Some of these may be included under such general titles as cultural practices, soybean production, etc.

So far, very little work has been done by the state stations on soybean diseases, including seed treatment. Only six projects are listed. The same seems to hold true for insects, also. Surely these lines will be considerably strengthened during the coming years. A very splendid disease research program by the U. S. Department of Agriculture is getting well under way. This is fortunate because diseases are taking a greater toll every year, and the number of diseases is increasing rapidly. The longer soybeans are grown in this country, the more trouble we shall expect from diseases. Research on control methods is therefore greatly needed.

Eleven projects on inoculation and nitrogen fixation are now in progress. Thirteen projects listed seem to fall under the general topic of botany, including physiology and ecology. It is our impression that a number of institutions are planning considerably more research along this line. Very little has been done on such important subjects as the effect of heat, cold and drouth on soybeans. Hail injury is another field which needs expansion. A real start is being made on the chemistry of the soybean plant and seed with particular reference to content of riboflavin, vitamin A, phosphatides, sterols, etc. We are all aware that the physiology of most of our farm crops has been seriously neglected.

Three experiment stations are investigating methods and efficiency of harvesting soybeans. It appears that our machinery companies are accomplishing much along these lines.

Four projects are noted on cost of production. We believe that a larger number of investigations than is shown by these four titles is in progress. Cost figures for soybean production are likely tied in with general cost studies on farm crops. This same thing surely holds for marketing, for only one project is shown specifically for soybean marketing.

Six projects involving the storage of soybeans are now active. The most extensive researches are being conducted at the University of Illinois under the general direction of B.P.I.S.A.E. cooperating with the departments of agricultural engineering, agronomy, and entomology. It is felt that this

[1]Letter from Fairmont Canning Company—H. E. Blesi.

[2]Soybean Projects of the State Agricultural Experiment Station — (Explanatory Note) 1944 Report. H. M. Steece.

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project is regional and that results will apply to most of the United States and particularly to the Upper Mississippi Valley country.

To judge by project titles it appears that the genetics of the soybean is being neglected. Only two stations list projects on this subject. Likely, however, many of the projects on breeding or improvement by breeding may include genetics as one of the objectives. This is true of Project 405 at the University of Illinois, which has the title, "Improvement of the Soybean." In view of the fact that breeding is based upon a knowledge of inheritance of characters, and that only a beginning has been made in a character analysis of the soybean, especially of quantitative characters having to do with yield and general performance, more projects on soybean genetics should be initiated by the state experiment stations.

Our experiment stations have done very little on the industrial utilization of soybeans. Only seven projects are active. Possibly this number is as small as it is because of the work of the Northern Regional Research Laboratory. On more than one occasion industry has indicated that much work should be done on the chemical characteristics of soybeans as they are being developed by the plant breeder. No doubt more work of this nature is being carried on than is indicated by project outlines.

EXTENSION SERVICE

III. *Contributions by the Extension Service* — In promoting the soybean in America, research has been only one part of the team. The agricultural extension service has been a very powerful force in bringing the facts based on research to the farmer. In the leading soybean states the extension workers have "been on the job" year in and year out. Especially during the early days, county soybean demonstration plots did much to keep the farmer up to date on new varieties and new ideas in soybean management and utilization on the farm. The extension people have done an unusually fine job in providing seed stocks from year to year; this has been notably true during times of emergency. Most of you are acquainted with production of seed stocks and the very rapid distribution of the Lincoln soybean. It is estimated that 75 percent of the soybeans grown in Illinois during 1946 were of the Lincoln variety. In this connection the soybean processors and machinery companies should be given credit for the furthering of our knowledge of soybean production and utilization. Surely no other crop has moved faster in the right direction than the soybean. This is because of a large body of facts rightly used. The soybean is a fine illustration of the statement that "research gives the fact basis for *clear* thinking and right acting."

We should like to close our remarks with a quotation from Herbert Hoover: *"Discovery and invention do not spring full grown from the brains of men. The labor of a host of men, great laboratories, long, patient, scientific experiments build up the structure of knowledge, not stone by stone, but particle by particle. This adding of fact to fact some day brings forth a revolutionary discovery, an illuminating hypothesis, a great generalization or a practical revolution."*

—s b d—

INDIANA FIELD DAY

Farmers from throughout Indiana and adjoining states were expected to attend the annual Purdue Corn and Soybean Day September 12 at the soils and crops experimental field just east of LaFayette.

Recently launched fertility studies on heavy applications of fertilizers, and especially of nitrogen for corn, were reviewed in the forenoon tour of the experimental plots.

Results from experiments dealing with the disposition of straw following grain harvest, which has been particularly heavy for the last 2 years stressed the importance of its removal if clover is to be saved.

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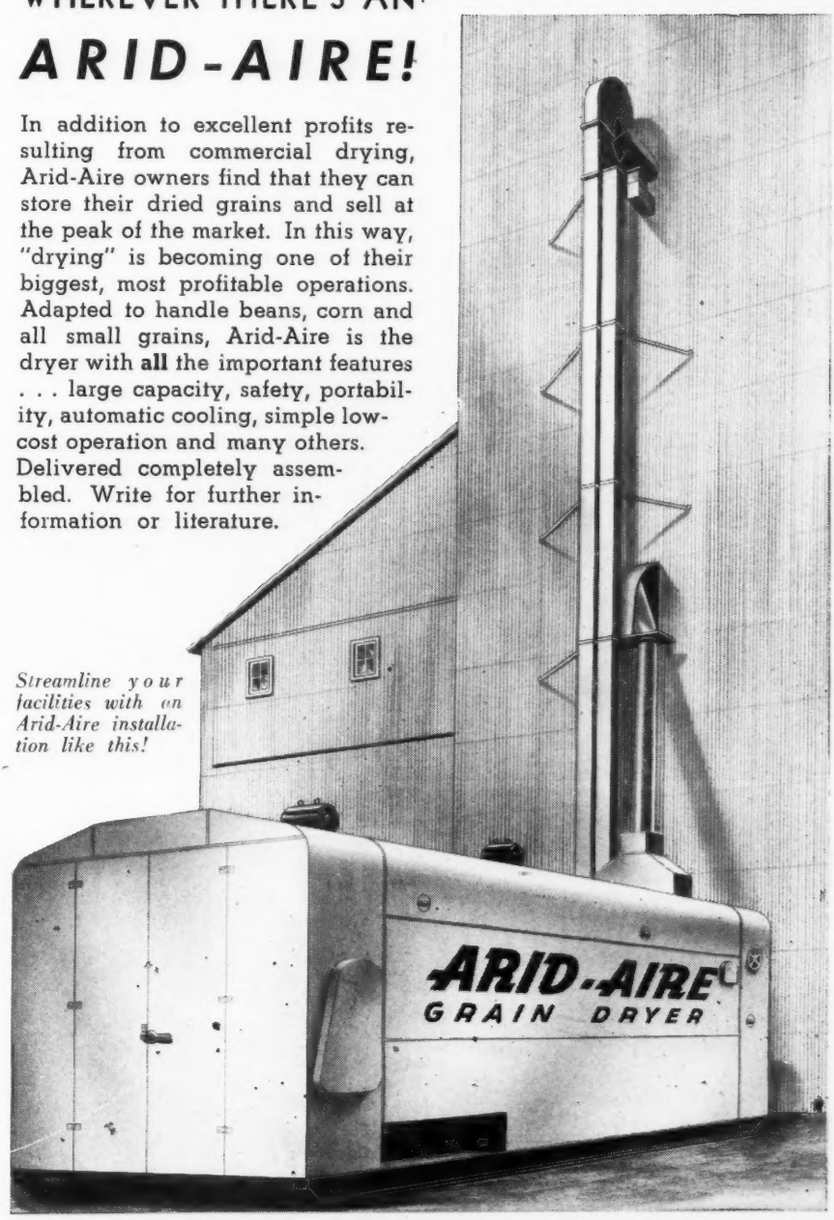

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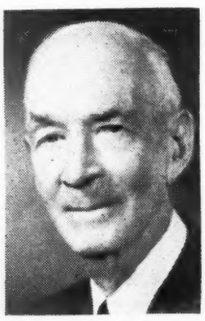
URGED IOWANS TO PLANT SOYS IN '94

Charles F. Curtiss, 83, dean emeritus of agriculture at Iowa State College, Ames, where he died July 30, was known in livestock circles everywhere. He was called "the best-known man in the livestock world."



C. F. CURTISS

But it may not be remembered by many that Dean Curtiss had an early influence on soybean growing, or that he was urging farmers to plant them in Iowa as long ago as 1894.

In 1894 a drought, second only to the disastrous one of 1934, was burning Iowa corn fields and blistering pastures hard and brown, reports Iowa State College information service. Cattle stumbled numbly over cracked stream beds. Everywhere farmers cried for relief.

Curtiss, then assistant director of the agricultural experiment station, told them to plant alfalfa and soybeans.

"Professor stuff!" they snorted. Soybeans and alfalfa wouldn't grow in Iowa and even a professor ought to know it, they said.

That was only the beginning of the struggle he had at first to get farmers to accept his "fool professor" ideas. Now soybeans and alfalfa wave on thousands of Iowa acres.

—s b d—

WERE 33 MILLION BU. COUNTIES IN 1946

Thirty-three of the nation's counties, 24 of them in Illinois, produced over 1 million bushels of soybeans each in 1946, according to figures released by the Bureau of Agricultural Economics in its publication, *Soybeans Harvested for Beans, Acreage, Yield and Production, 1945 and 1946, by Counties for 18 Principal States.*

Champaign County, Ill., still retains its longtime position as the nation's leading soybean producing county, with 3,928,500 bushels. Christian County was second with 3,190,000 bushels.

Other counties that produced a million or more bushels in 1946: Vermillion, Ill., 2,923,300; Sangamon, Ill., 2,825,000; Macoupin, Ill., 2,364,000; Macon, Ill., 2,328,000; Shelby, Ill., 2,272,600; New Madrid Mo., 2,182,500; Iroquois, Ill., 2,178,100; Mississippi, Ark., 2,161,000; Edgar Ill., 2,160,000; McLean, Ill., 2,051,400; Montgomery, Ill., 1,934,100; Piatt, Ill., 1,903,200; Logan, Ill., 1,886,400; Coles, Ill., 1,772,500; Douglas, Ill., 1,731,400; Pemiscot, Mo., 1,581,000; Hancock, Ill., 1,580,800; Morgan, Ill., 1,534,000; Dunklin, Mo., 1,435,200; De Witt, Ill., 1,408,000; Livingston, Ill., 1,344,000; Kankakee, Ill., 1,268,400; Moultrie, Ill., 1,267,200; Kossuth, Iowa, 1,229,600; Fayette, Ill., 1,116,000; La Salle, Ill., 1,115,000; Webster, Iowa, 1,101,000; Pocahontas, Iowa, 1,076,000; Adams, Ill., 1,032,200; Wood, Ohio, 1,026,000; Will, Ill., 1,016,400.

States covered by the report: Arkansas, Delaware, Illinois, Indiana, Iowa, Kansas, Kentucky, Maryland, Michigan, Minnesota, Mississippi, Missouri, Nebraska, North Carolina, Ohio, Tennessee, Virginia, Wisconsin.

—s b d—

IOWA FIELD DAY

The Iowa Corn-Soybean Field Day will be held at the Iowa State College Agronomy Farm, Ames, on Sept. 19 this year, 1 week later than had previously been planned.

The annual event was moved back 1 week because of the late maturity of this year's corn.

Soybeans are expected to be in better shape than the corn. The field day is open to all interested Iowans.

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THE CENTRAL SOYA COMPANY, INC.

(EXECUTIVE OFFFICE)

FORT WAYNE, INDIANA

SWIFT MANAGER

The appointment of E. C. McGee as manager of the Swift & Co. soybean mill at Des Moines, Iowa, was announced by C. T. Prindeville, vice president of the company.

Mr. McGee succeeds A. Frank Leathers, who had been manager since 1939. Mr. Leathers will return to Chicago where he has been assigned to work in the president's office.

McGee joined Swift in 1927 at the Atlanta, Ga., refinery in the accounting department. In 1941 he moved to the Chicago general office as assistant manager of the oil mill and refinery accounting department. In 1943 he was transferred to the oil mill department in the general office.

Mr. Leathers was made sales manager of the Champaign, Ill., soybean mill in 1937. He was appointed manager of the new Des Moines mill at the time construction was started.

—s b d—

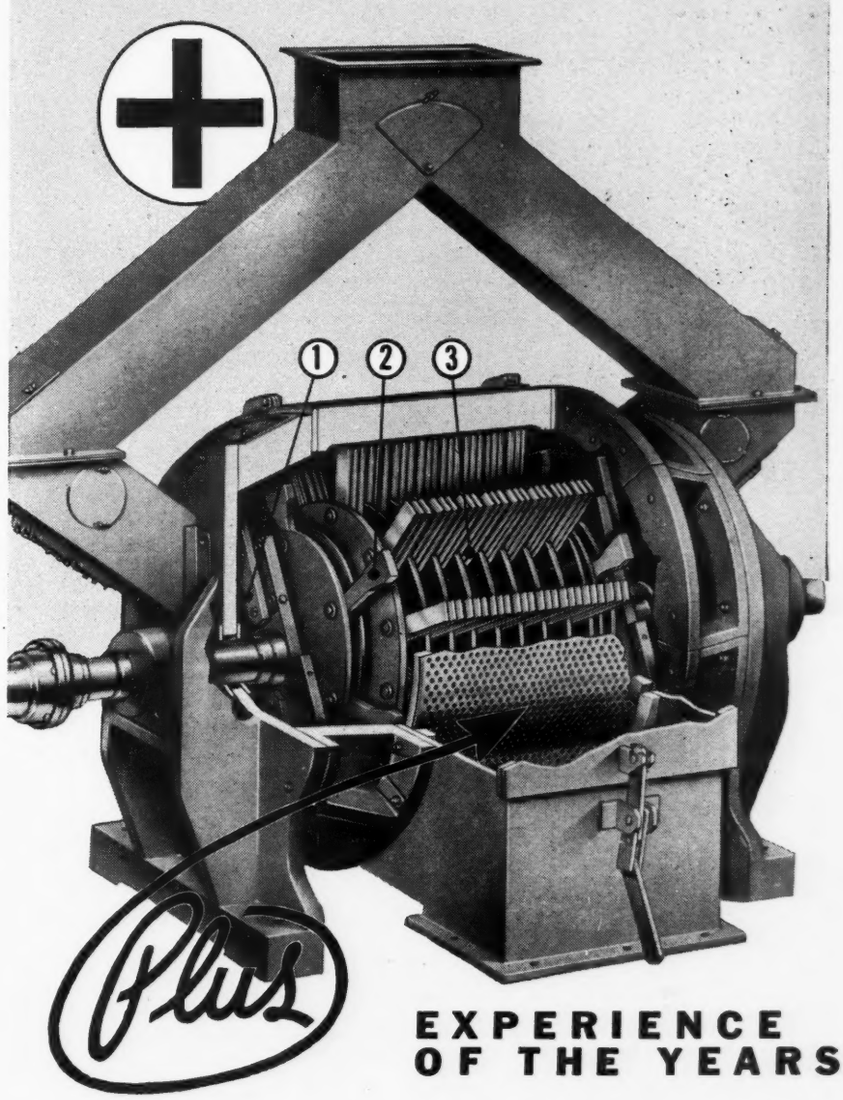
SOYA STEROLS PLANT

The Glidden Co. has completed a new plant in Chicago for the commercial recovery of soya sterols, Paul E. Sprague, vice president and assistant to the president, has announced.

Mr. Sprague said that stigmasterol and sitosterol, two important sterols (wax-like alcohols used in making sex hormones and other fine chemicals), had been found in small amounts in the soybean but until now have not been recoverable on a commercial scale. The new Glidden plant, he said, represents the culmination of 6 years of intensive work by Dr. Percy L. Julian, director of research for the soya products division of the Glidden Co., and his staff.

Believed to be the first commercial operation in the world devoted to recovery of soya sterols by chemical methods, the new plant in all stages of production will employ new processes developed entirely by the Glidden research organization.

TRIPLE REDUCTION



EXPERIENCE OF THE YEARS

The Annual Conventions of the American Soybean Association represent the milestones of progress in the industry — these years have seen the development of Soybean industry to an important economic factor in the nation, through better utilization of Soya products.

These years have also marked the development of the Prater Dual Screen Pulverizer to an industry wide position of leadership in the production of a uniform granular flour free product.

The years ahead give promise of even greater progress based on product development, industry co-operation and service.

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MONTANA MARGARINE LAW HELD INVALID

Another nail was driven into the coffin of the various state margarine laws August 7 when a lower Montana court found unconstitutional a section of the state's margarine law applying to wholesale and retail license fees.

District Judge A. J. Horsky of Lewis and Clark County ruled that imposition of wholesale fees of $250 per quarter and retail fees of $100 per quarter violated the state constitution on four counts.

The suit was brought by O. L. Brackman, a grocer, against Albert H. Kruse, state commissioner of agriculture and Thomas E. McMasters, state dairy commissioner.

Judge Horsky observed that the "license fee . . . paid by retail dealers in oleomargarine . . . is so excessive and unreasonable in amount as to prohibit the sale of oleomargarine by more than 92 percent of the grocery stores in Montana."

He pointed out that the fee had made of the sale of margarine a virtual monopoly in the hands of large independent and chain store grocers who were able to pay the fee and sell margarine at a loss to attract patrons.

Judge Horsky found the section unconstitutional in that it deprived the plaintiff of liberty and property without due process of law; that it denied the plaintiff the right to carry on a lawful business without due process of law; and that it assessed a tax which resulted in unreasonable and arbitrary discrimination.

The judge also found that the section "levies a tax not for a public or government purpose, but . . . for a private purpose, . . . for prohibiting in large part the sale of oleomargarine in Montana in aid of the dairy industry."

No margarine is manufactured in Montana. All sold within the state is shipped in from other states.

—s b d—

CARGILL ELECTS

At a recent meeting of the board of directors of Cargill, Inc., Minneapolis, H. Terry Morrison was elected vice president in charge of the mechanical division, Walter F. Gage was named assistant vice president in the sales division, and E. K. Peterson was appointed assistant vice president in charge of the seed division.

All previous officers of the company were reelected. The following were reelected to the board of directors: John H. MacMillan, Jr., Austen S. Cargill, Cargill MacMillan, E. J. Grimes, John G. Peterson, Julius Hendel, Howard I. McMillan and Fred M. Seed.

Mr. Morrison for many years was a commission broker on the New York stock exchange. He served in both World War I and II, his last assignment being deputy chief of staff, Army Air Forces Training Command, with the rank of Colonel. He has been acting head of the mechanical division for the past year.

Mr. Gage has been associated with Cargill for the past 11 years. His background embraces grain merchandising at Minneapolis, Washington, D. C., and Buffalo, N. Y. He was manager of Cargill's Buffalo branch until a year ago, when he returned to Minneapolis to participate in the management of terminal branch offices of the company.

Mr. Peterson has just rounded out an even 20 years with Cargill, all of them spent in buying and selling of field seeds. His foresight and untiring energy are largely responsible for the development of Cargill hybrid seed corn.

—s b d—

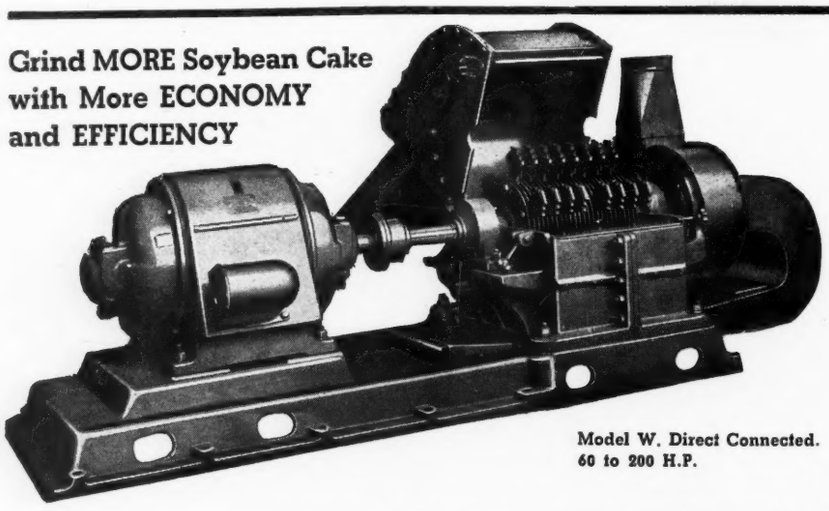
CANADIAN ACREAGE

The estimated 72,000 soybean acreage for 1947, all of which is in the province of Ontario, is the largest on record for Canada, reports *Foreign Crops and Markets*. In 1946, 59,000 acres yielded 1.1 million bushels of beans.

Since domestic requirements are approximately 3.5 million bushels, continued imports of substantial quantities will be necessary.

The official price increase from $2.15 to $2.40 per bushel, established November 1946 and made retroactive for the entire 1946 crop, has been an incentive for growers to increase their acreages.

Grind MORE Soybean Cake with More ECONOMY and EFFICIENCY



Model W. Direct Connected. 60 to 200 H.P.

JAY BEE

Hammermill

Grinds Anything Grindable!

- **Soybean Cake**
- **Peanut Cake**
- **Linseed**
- **Cottonseed**
- **Fertilizer Ingredients**
- **Tankage**
- **All Grains**
- **Roughage**

For hammermill grinding, JAY BEE leads! It's the choice of mill operators who must meet heavy schedules. More JAY BEE's are in feed plants than any other type of mill.

JAY BEE **stays on the job,** day and night if necessary, with little or no stops for repairs. Tough as an Army tank! "It's unbreakable!" says an operator.

Over a quarter of a century mill making experience, that produces the JAY BEE, now pays big dividends to mill operators.

JAY BEE Grinders are furnished with belt, V-belt and direct connected drive in from 12 to 200 H.P. for every grinding and pulverizing purpose.

Whatever your grinding needs, write one of the addresses below for details of JAY BEE Grinding Equipment.

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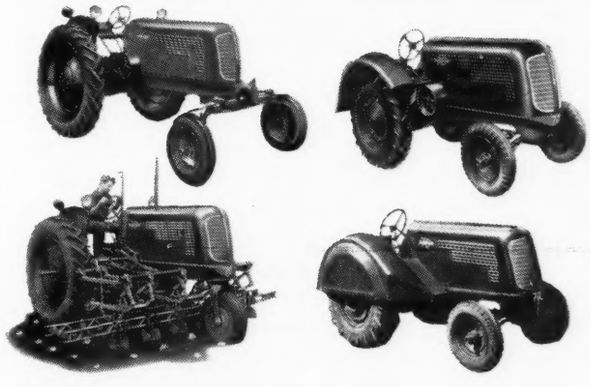
H. A. McLeod ..... Forest, Mississippi
J. R. Sorrells ..... Dothan, Ala.
E. B. Harrison ..... Cairo, Georgia
O. D. Padgett ..... Sandersville, Ga.
Frank S. Sanders..... P.O. Box 655, Gainesville, Fla.
M. E. Padgett ..... Bennettsville, S. C.
Jay Bee Sales Co. ..... Jackson, Tenn.
J. D. Vance ..... P.O. Box 497, Murfreesboro, Tenn.
Jay Bee Sales Co. ....4619 So. 7th Ave., Louisville, Ky.
R. E. Perkins ..... 1508 S. First St., Louisville, Ky.
W. H. Hust, Jay Bee Co. ..... 1031 N. Humphrey Ave., Oak Park, Ill.
A. F. Shirk ..... Box 523, Canton, Ohio
Lima Armature Works ..... Lima, Ohio
The Sanders Co. ..... Greenwich, Ohio
T. G. Holland Mach. Co. ..... 474 Fairfax Rd., Drexel Hill, Pa.
Jay Bee Sales Co., 220 Broadway, New York 7, N. Y.
C. Y. Wier, Jr. .....319 Rutger St., Utica 1, N. Y.
A. E. Thompson Co. ..... 718 Washington Ave. N., Minneapolis, Minn.
Jay Bee of Texas .....1904 S. Akard St., Dallas, Texas
Douglas W. Palmer, 3808 44th Ave. S.W., Seattle, Wash.
L. C. Dibert Company ..... 787-793 Brannan St., San Francisco, Calif.
Western Engineering & Equipment Co. ..... 5699 District Blvd., Los Angeles, Calif.

6 cylinders 6 speeds *in the* OLIVER 70

2 Basic Types . . . 5 Regular Models



There's an Oliver 70 to fit *your* farm and *your* cropping practices. In addition to the Row Crop model, you have a choice of four others: the rugged Standard for general work, the 4-wheel High Clearance or Single front Wheel Row Crop models with their adaptability to special conditions and crops as well as diversified farming, and the Orchard and Grove 70 with its trim, sweeping lines. For each model you also have a choice of two husky six-cylinder engines, depending on the type of fuel you want to use.

SIX CYLINDERS give you greater range in *each* speed. Six speeds give you greater adaptability for any job. *Six* cylinders permit you to use a higher gear and increased speed to save man-hours. Six speeds enable you to use your Oliver 70 more efficiently to save fuel . . . and time.

The Oliver 70's six-cylinder, six-speed transmission and Fuel Miser Governor provide you with the *best* combination to do your farm work more economically.

The OLIVER Corporation
400 W. Madison St., Chicago 6, Illinois

THE OLIVER CORPORATION

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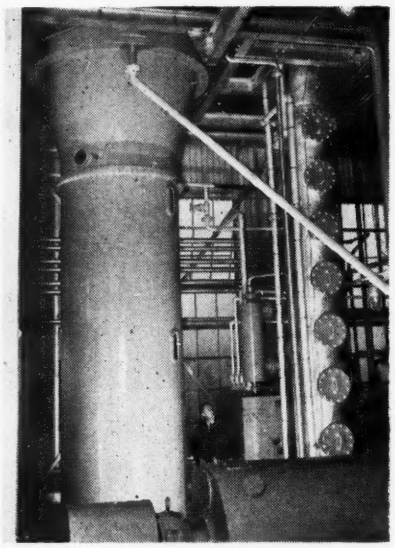
FACTS *about genuine*

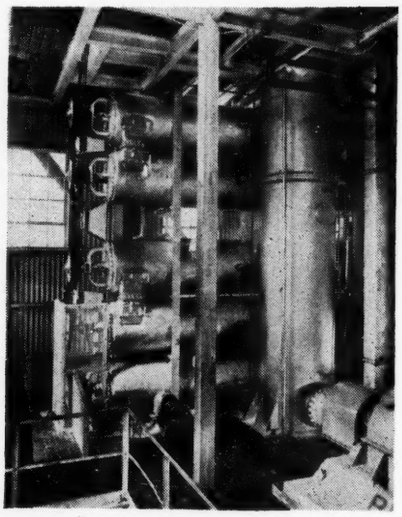
Soy Sauce

A bulletin describing genuine Soy Sauce, why this product is a 'must' item as a table condiment for steaks, roasts and chops and a kitchen secret used by famous chefs in making soups, gravies, salads and dressings sent on request mailed to

LaChoy Food Products Division
Beatrice Foods Co. Archbold, Ohio

New Allis-Chalmers Extraction Plant





At left is the large countercurrent column, an important part of the new Allis-Chalmers solvent oil extraction plant. Also seen in the same picture are centrifugal separator in foreground and stripping column at right. In right picture is the top tier of a seven-high bank of chain driven driers. On the right of this picture is a drier vapor scrubber.

Allis-Chalmers engineers have recently developed a continuous solvent extraction plant for the recovery of cottonseed oil. After 5 years of continuous research, application of A-C's solvent extraction process has been extended to include other oilbearing seeds including soybeans.

Although solvent processing has been applied to soybeans in this country for 20 years, the *continuous* solvent extraction principle developed by Allis-Chalmers engineers has not only increased soybean oil yield by 17 percent. It has done what German techniques failed to do — proved to be successfully applicable to all oilbearing seeds, according to the Allis-Chalmers Manufacturing Co.

One of the most significant factors involved with the new process is the marked reduction in labor costs. With the old pressing methods, the Delta Products Co. at Wilson, Ark., which recently installed A-C extraction equipment, employed 32 skilled workers to obtain a 200-ton daily output. With the solvent process only four men will produce 240 tons daily. This will mean an additional revenue of from 20 to 25 million dollars annually.

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KANSAS MERGER

The Kansas Soybean Mills of Emporia and the Kansas Soya Products, of Kansas City, were merged and consolidated recently as the Kansas Soya Products Co., Inc.

The authorized capital is $1,200,000 and the minimum amount of capital the new corporation will have upon completion of the merger will be $624,890.

The first soybean mill to be erected in Kansas, the Kansas Soybean Mills, of Emporia, was organized in October 1940.

Organized in 1943, the Kansas Soya Products, Inc., Kansas City, was the second largest soybean mill in the state.

The directors and officers of the Kansas Soya Products Co., Inc., of Emporia, are identical with those of the merged companies.

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Laboratories, Inc.

Main Office, Laboratories,
MEMPHIS, TENNESSEE

ASSOCIATED LABORATORIES:
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We have participated in developing methods of analysis for Soybeans and Oil and especially the procedure for determining Refining Loss and Bleached Color.

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National Soybean Processors' Ass'n

Referee Chemists of
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Largest and best equipped commercial laboratories south of the Ohio River.

SOYBEANS NEED INOCULATION

Because of their high protein content Soybeans need lots of nitrogen for proper development and quick maturity. Impress this on your grower customers and be sure that they inoculate **all** seed at **every** planting, with NOD-O-GEN from the Farm Laboratory Division of The Albert Dickinson Company.

Leading jobbers the country over handle this highest quality, pre-tested inoculant in strains for all commercially grown legumes.

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THE ALBERT DICKINSON COMPANY
P.O. Box 788, Chicago 90, Illinois
Established 1854

NOD-O-GEN The Pre-Tested Inoculator
The Crop and Profit "Pepper Upper"

CONVENTION

(Continued from page 16)

Skelly Oil Co., Kansas City, Mo.

Exact Weight Scale Co., Columbus, Ohio.

Agricultural Laboratories, Inc., Columbus, Ohio.

V. D. Anderson Co., Cleveland, Ohio.

Butler Manufacturing Co., Kansas City, Mo.

National Association of Margarine Manufacturers, Washington, D. C.

Wm. H. Banks Warehouses, Inc., Chicago, Ill.

American Cyanamid Co., New York, N. Y.

Nitragin Co., Inc., Milwaukee, Wis.

Seedburo Equipment Co., Chicago, Ill.

International Nutrition Laboratory, Mt. Vernon, Ohio.

Humphrey Elevator Co., Faribault, Minn.

ASSOCIATION COMMITTEES

Members of the executive committee are President Walley, Vice President Weigle, Roach and McLaughlin.

The legislative committee: David G. Wing, Mechanicsburg, Ohio; Jacob Hartz, John W. Evans, and the three officers of the Association as ex-officio members.

The awards committee for 1948: Weigle, Edmondson, J. W. Calland, Central Soya Co., Inc., Decatur, Ind.; and Dr. W. J. Morse, Bureau of Plant Industry, Beltsville, Md.

The Association's 1948 convention site will be picked later by the board of directors.

Statement of the President

1946-1947 Fiscal Year

The American Soybean Association has completed its 27th year of existence. Twenty-seven years ago soybeans were a new crop, and very little was known about them in this country.

The average yield of varieties grown in those early years in Illinois was only about 16 bushels per acre. The cost of growing and harvesting a crop was around $30 per acre.

There are three things largely responsible for the rapid development of the soybean industry in the Midwest. The first was the development of improved varieties by the plant breeders. The second was the development of improved machinery, and improved practice in growing and harvesting the crop. The third was the development of the processing industry which furnished a market for the beans.

Today a bushel of beans is produced with 10 minutes of man labor, whereas it required 50 minutes in the early 1920's. Soybeans are no longer a new crop. They have earned a permanent place in Cornbelt rotations. They are a major oil seed crop, and are here to stay.

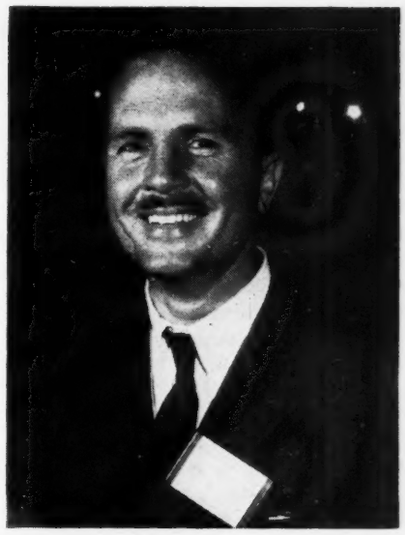
This Association has gone through its growing pains, along with soybeans!

It has a past record of accomplishments of which you may well be proud, but no organization can live on past accomplishments. We must go forward, in order to keep pace with the soybean industry.

Your secretary has told you of the trips to Washington during the past year which were made by him and by other directors and officers.

When down in Washington we found that other industries were very well represented. The soybean processors, the margarine manufacturers, the cotton growers and crushers, the peanut growers, and the dairy interests are all well represented in Washington. The soybean growers should be well represented in those government meetings in which policies affecting the future of soybeans are discussed and adopted.

This will take money. This money and moral support should come from the soybean



Dr. F. X. Laubscher, visitor from South Africa, described soybean growing in his part of the world at the convention.

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. . . A familiarity with commodity markets that talks price, contract, and position even in its sleep . . . a contact that gives you the quick slant on every development likely to affect your dollar risk . . . coordinated service that gives you *fast* action when prices are playing tag with your profits.

That's the kind of service we offer through our 95 offices . . . in 93 cities . . . in areas where commodities are grown or processed.

Big? That's right—big enough to *specialize* in *every one* of the 38 commodity markets. Big enough to speak with knowledge when a fact is in question. Big enough to bring you this morning's spot reports in a matter of minutes over 40,000 miles of private wires. And big enough to take the pulse of *every* market, analyze the situation, and deliver the results *when* you need them.

If this approach makes sense in your business, just write, wire, or 'phone our office nearest you. Or get in touch with our headquarters office. We'll do the rest. Address Dep't. W-9.

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growers. A fraction of a cent a bushel would furnish the necessary money.

Your secretary has told you that a lot of preliminary work has been done toward setting up a financing program. We have had fine cooperation from the processors. It will require continued cooperation from the processors, from the state grain dealers organizations, and from the individual grain dealers throughout the bean growing states in order to inagurate a sound educational and promotional program, and make it work. It is a big order, but we believe it can be done this coming year.

May we bespeak the continued cooperation of every member of the American Soybean Association, so that the soybean industry in the future may hold its rightful place beside the other industries of this great country.

WALTER W. McLAUGHLIN,
President.

Report of Secretary

1946-47 Fiscal Year

The year which has elapsed since our 26th annual convention in St. Louis last August has been an eventful one. It has been a period of postwar adjustment in the industry, a year of a bumper crop and high soybean prices. It saw soybean prices paid to the farmer jump from $2.31 top on October 15 to a top well above $3.00 just a few days later. Soybean oil meal prices have fluctuated from about $55 per ton to above $100 per ton, and soybean oil has fluctuated from 11¾ cents per pound to 35 cents per pound within the year. It has been a year of good prices to the grower and high profits to the processor. It has been a part of the period of adjustment following the war.

In the first full year of operation following the incorporation of the American Soybean Association we have made more financial progress than in any other year since your present Secretary took over his duties. The net worth of the Association now totals $17,571.76. During the year new equipment for the office has been purchased, a safe-cabinet has been added, desks have been added, and filing facilities increased. The year's operations, based on current inventory costs of supplies, shows a net profit of $5,436.99. This figure is almost twice that of any other year's operations in the history of the Association.

The American Soybean Association was not organized and is not operated for profit. As the *Soybean Digest* has earned additional revenue it has been plowed back into additional art work, engravings, better stories, new features. Earnings have been used to increase the usefulness of the Association to its members and to the industry. The Association is on the soundest financial footing in its history, with a net worth of 50 percent above the figure of a year ago.

During the past year we have issued the first edition of the *Soybean Blue Book*, a directory of the soybean industry which we plan to issue on an annual basis. In the first edition we included a great deal of statistical material on soybean production and utilization, as it was our belief that such material should logically be brought together for use in the industry. The reception accorded this publication was very favorable. The comments received, along with the suggestions for its betterment, will form the basis of our plans for the 1948 edition. It is planned to issue such a volume about March 1 of each year. It has definite advertising value to those organizations serving the industry, especially the grain-handling and processing phases, and it is our feeling that it has already made a place for itself. The first year the publication more than paid for itself in advertising revenue and in sales of copies. One copy was supplied to each member of the American Soybean Association, and additional copies were purchased by a rather large number of firms.

LEGISLATIVE ACTIVITIES

Legislative activities of the American Soybean Association have been numerous. With Congress in session, there were a number of bills requiring attention. Your Secretary made two trips to Washington during the year, your President made one, and David G. Wing made one. The legislative and executive committees met with the executive committee of the National Soybean Processors Association and representatives of the National Association of Margarine Manufacturers, and also, on a different occasion, with a representative of the National Cotton Council.

Membership in the Association has increased during the year, and we are planning to launch a big membership campaign immediately following this convention. Through the courtesy of the National Soybean Processors Association we have been given use of a list of names of over 100,000 soybean growers who sold beans through local grain dealers in 1946. That list should include a large number of growers who would be interested in membership in the American Soybean Association. It is our plan to make a series of mailings to that list in an endeavor to double the membership of the Association during the next year.

The officers of the American Soybean Association have cooperated with officials of the Soy Flour Association wherever possible. As a result of meetings called by that Association and attended by your Secretary, the U. S. Army has placed orders for 110,000 tons of soy flour to be used for foreign feeding purposes during the past 4 months. Further orders are expected. This has added a very material market for Midwest soybeans.

Mr. Ersel Walley represented the American Soybean Association in a meeting with the Secretary of Agriculture pertaining to

Soybean Men have inspected . . .

The Improved WESTERN Pellet Machine

with approving comment on its superior construction for:

- PRODUCING PELLETS FROM SOYBEAN MEAL.
- Easy one-man operation.
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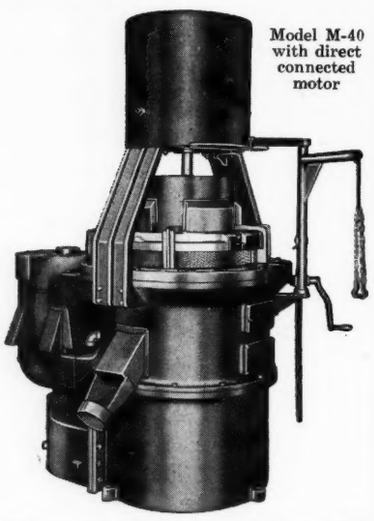
- Get all the facts. Meet the growing demand for protein. "Soybean Feeds at their Best."



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Moisture in soybeans varies from hour to hour as the sun dries the heavy dew. Seed pods are usually tough in the morning — brittle at mid-day — and tough again as evening approaches.

The secret of soybean harvesting is to adjust the cylinder speed *instantly* for this rising and falling tide of moisture. The All-Crop Harvester's Quick Speed-Changer Control makes it as easy as tuning your radio.

The cylinder is the all-important factor in harvesting soybeans, sorghums, grass and legume seed crops. Tough conditions require higher speeds to thresh the grain or seed from heads or pods. Dry, brittle conditions require slower speeds to avoid damage to kernels.

The All-Crop Harvester's famous full-width, rubber-faced, spiral-bar cylinder processes the crop gently and thoroughly in a wide, thin stream . . . *at the proper speed to save it all.*

TO BETTER LIVING
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TO MORE PROFIT

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TRACTOR DIVISION — MILWAUKEE 1, U. S. A.

Weekly High Spot of Radio . . **THE NATIONAL FARM AND HOME HOUR** *"A Service to Agriculture"*
SATURDAY • NBC

Here you see two employees of the Capital City Products Co. at the conveyor line in the firm's margarine packaging department during the trip through the plant. Coming off the line is fully packaged Dixie Margarine.

the relaxation of export controls on protein meals in early June. Your president attended a session on August 25th, devoted to export controls of oilseed crops, and he will report personally to you on that meeting.

I believe everyone connected with the soybean industry recognizes the need for a strong organization representing the growers of soybeans. Such an organization is necessary to progress. With that in mind, the executive committee from the American Soybean Association has met with a committee from the National Soybean Processors Association on two occasions in recent months to consider procedures. There is nothing definite to report yet except that negotiations are being carried on between the two organizations, but it is possible that a concerted program for establishing and financing the American Soybean Association will be formulated within the next few months.

If the soybean industry is to be adequately represented in those meetings where policy and government attitude is established, we must represent a larger proportion of the actual growers of soybeans in the United States. It is toward that end that the committee has been working. It is hoped that before the next annual meeting of this Association there will be concrete evidence of such cooperation.

GEO. M. STRAYER,
Secretary.

Resolutions

Report of the Resolutions Committee

The following resolutions, here adopted, express the sentiment, policy and determination of the American Soybean Association.

(1)

Resolved, that on behalf of the soybean growers, whose crop accounts for over 60 percent of the vegetable protein meal and over 50 percent of the edible vegetable oil produced in the United States, the Association affirm policies and pursue programs consistent with the permanence and economic importance of this crop and the industry connected with it.

(2)

Resolved, that the Association insist that the soybean, and the products derived from it, deserves to compete on its merits with any other agricultural or livestock product from American farms.

In furtherance of this policy the Association stands ready to oppose all license controls, regulations and taxes—local, state or federal—which unfairly hamper or discriminate against the use of soybean products.

(3)

The Association recognizes the implications of world peace and security in connection with national trade barriers. In the adoption of any national foreign trade policy the Association must insist that the soybean industry accept only its fair share of possible competition from imports as compared with American producers of other agricultural products and industrial goods.

(4)

Resolved, that the Association urge the effective promulgation of governmental policies, rulings and actions which affect the soybean economy previous to the movement of the new crop in order to avoid such unfortunate incidents as the removal of price controls in the fall of 1946 after such a large percentage of the crop had left growers hands. A current example may be found in the need of an immediate announcement of export policies, particularly those affecting fats and oils.

(5)

Resolved, that the Association acclaim advancements in applying the value of the soybean to the human nutritional needs of the world and through the columns of the *Soybean Digest* provide full information to

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When You Have Soybeans to Offer

our members regarding such projects as the "Meals For Millions" campaign.

(6)

Resolved, that the Association encourage all experimental and research agencies—private, state and federal—to initiate and continue study upon the following problems affecting the soybean growers and related industries.

(a) Means of controlling diseases and pests injuring the crop.

(b) Continued development of improved varieties and cultural methods.

(c) Marketing problems incident to the movement of such a large portion of the crop from the farm to market during a short harvesting period.

(d) Feeding trials that should include soybean meals.

(e) Expanded use of soy flour and soy oil in relation to human nutrition.

(f) Expanded use of soybean derivatives in industry.

(g) Factual data needed in connection with the incorporation of soybeans as a permanent cash crop in farm cropping systems.

(7)

Resolved, that the Association make a determined effort to establish more substantial means of financing itself in order to safeguard properly the interests of soybean growers, to promote the broad objectives of the Association, and to cooperate with other agencies having common interests with them.

(8)

Resolved, that the Association express its gratitude and profound appreciation to the following:

(a) The soybean trade, the National Soybean Processors Association, the Soy Flour Association, the National Association of Margarine Manufacturers, the Cotton Council, and other organizations from which it has received such fine and unstinted cooperation.

(b) The advertisers, the editor and the entire staff of the *Soybean Digest* for their cooperation and efforts in making this such an important and valuable publication.

(c) The crop committee of the National Soybean Processors Association, the Soybean Research Council, the agronomy department of Central Soya Co., Inc., agricultural agents of our railroads, regional laboratories of the United States Department of Agriculture, the various state experiment stations and extension service of our land grant colleges, and the state crop improvement associations for their fine work in promoting not only better varieties of beans but better cultural methods and protective measures.

(d) Our secretary and his staff for their outstanding efforts in behalf of the soybean growers, particularly, and the soybean industry in general.

(e) The directors and officers who have given so freely of their time without stint and pay in carrying on the association's work.

(f) Ohio State University and its staff serving as host for this meeting, the Ohio Soybean Processors, and our convention committee who have contributed so generously in planning and carrying out such unusual and complete arrangements for this meeting.

(g) To all our speakers who combine in these programs to bring us the latest reports and advanced thinking affecting soybean growing and industry.

—s b d—

LIFE MEMBERS

(Continued from page 18)

Mr. McIlroy has served as its president from the beginning and is now managing for absentee owners farms valued at 8 million dollars.

His contribution to the soybean interests has been definite and extensive. He began growing soybeans on his own farm in 1909, and continued to pioneer with this crop, despite criticism, discouragement and some ridicule, until it found its rightful place in the rotation.

After assuming the management of hundreds of other farms, through his organization, he continued to stress the value of soybeans as a regular crop in the rotation for Ohio farming, from the standpoint of higher incomes. This policy has given tremendous impetus to the interest in the crop among farmers in Ohio.

He served as president of the American Soybean Association during the years of 1939, 1940 and 1941 and has since been retained as a member of the board of directors.

—s b d—

SWIFT LETS CONTRACT

General contracts for construction of two buildings to be part of the new technical products plant at Hammond, Ind., have been awarded by Swift & Co.

Construction of the two units is expected to be underway soon with completion scheduled for some time in 1948. The general contract was awarded to the George Sollitt Construction Co., Chicago.

The new technical products plant will be the first of its kind in commercial production, Swift says. It will process special oils for use in manufacture of rubber, textiles, soap, cosmetics, linoleum, paint, lubricants and many other products.

Plans are also going forward for an extensive modernizing of Swift & Co.'s soybean oil mill at Champaign, Ill. New buildings proposed will include a solvent extraction unit, concrete storage elevator, oil meal warehouse, bean preparation and oil meal processing units, and a new boiler plant, Nelson P. Noble, manager, says.

SOY-RICH PRODUCTS

INCORPORATED

WICHITA, KANSAS

THE SOYBEAN PLANT NEAREST TO THE SOUTHWEST

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Truck Lots — Car Lots

CROP CUT 7 MILLION BUSHELS

Dry weather and extremely high temperatures in Iowa, Illinois and the area to the south of these states cut the September 1 estimate of soybean production nationally almost 7 million bushels from the August 1 report.

The September 1 estimate of the crop reporting board of the U. S. Department of Agriculture is for 181,247,000 bushels, about 8 percent below last year and the lowest since 1941.

Despite the heat, the crop is reported to have stood up extremely well in the dry areas. To the east in Ohio and much of Indiana yield prospects improved over a month ago.

Here are the official estimates of production by states: Ohio, 15,426,000; Indiana, 26,010,000; Illinois, 64,087,000; Michigan, 1,170,000; Wisconsin, 416,000; Minnesota, 13,950,000; Iowa, 30,719,000; Missouri, 10,569,000; Kansas, 2,174,000; Virginia, 1,530,000; North Carolina, 3,220,000; Kentucky, 1,440,000; Tennessee, 850,000; Mississippi, 1,552,000; Arkansas, 4,350,000; other states, 3,784,000.

Some grasshopper damage is being reported. Some additional farm storage is being built, and with storage available due to short corn and oat crops farmers may store up to 20 percent more soybeans than in 1946 in leading soybean states.

Reports from *Soybean Digest* correspondents follow, for August 28, unless otherwise noted:

ARKANSAS

Jacob Hartz, Stuttgart, for east central: (Aug. 25) Weather very dry. Entering our 6th week of drought. Expected per acre yield one-fourth to one-third less unless we get rains at once. Late varieties will make normal crop if we get a good general rain in week to 10 days.

Wheeler R. Perkins, extension agronomist, Little Rock: Maturity late. Very dry in upland areas. Delta area not hurt too badly by drought. Expected per-acre yield 11.5 bu. compared with 12.8 bu. normal.

L. M. Humphrey, R. L. Dortch Seed Farms, Scott, Ark., for Little Rock region: (September 1) Weather very dry and hot. Total yield expected about 85% of 1946. Prospects 6 weeks ago were for a fine crop. Continued hot dry weather has seriously damaged it. Quite a little damage from cucumber bettles and worms.

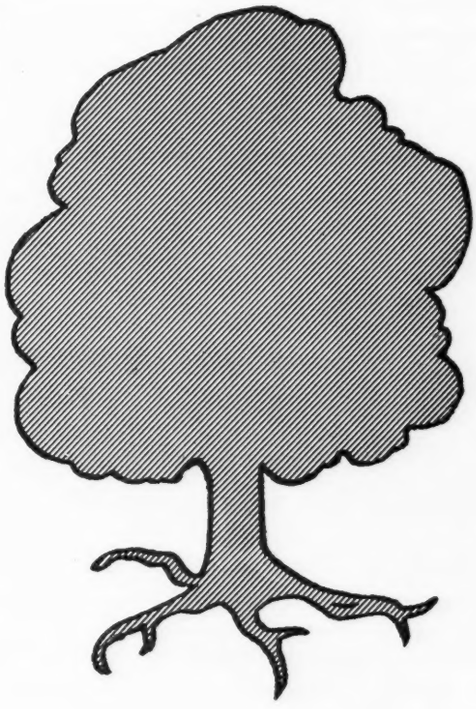
ILLINOIS

H. J. Gramlich, general agricultural agent, Chicago & Northwestern Railway: Dry weather throughout Iowa and Illinois, where major part of soybean crop is produced, has hurt the total yield materially, though plants have taken the abuse pretty well. No chance for the bumper crop that looked possible the first of the month.

Frank S. Garwood & Sons, Stonington, for south central: Maturity 1 to 2 weeks later than normal. Weather very dry through July and August with a few local showers in past week. Beans shorter in height than normal but apparently podding reasonably well. Expected per acre yield 90% of normal; total yield will be somewhat less. No pest or disease damage showing at present time. Damage by earlier-than-normal frost would be considerable as there are lots of late soybeans.

Walter W. McLaughlin, Decatur, for vicinity: Maturity 90% of normal. Very dry in some parts. Scattered showers have helped. Expected per-acre yield 90% of normal; total expected yield 95% of 1946. 10% might be damaged by early frost.

J. E. Johnson, Champaign, for Champaign and adjoining counties: Maturity 10 days to 2 weeks late. With continued high temperature soybeans have gained some over late start. Temperatures extremely high with light rainfall. Some sections haven't had a rain of any consequence for month to 6 weeks. Some local rains past few days. Very spotty. Probably the total yield for this section may be little below good average years. On the whole soybean crop looks unusually good. Reports of poor filling, however. Most sections have had good



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Fine products are a heritage at General Mills, Inc. Modern equipment, raw and finished material controls backed up by an active research program, assure you of continued high quality.

Today, the Chemical Division of General Mills provides industry with soybean oil meal and a complete line of refined soybean oils for the technical trade. A new product made from soybean oil, General Mills Polyamide Resin, is also being offered commercially and will find application in the paper coating and heat seal adhesive fields. We will shortly be in position to offer a complete line of fatty acids and organic chemical derivatives.

General Mills, Inc.
CHEMICAL DIVISION
Minneapolis, Minnesota

dews and light sprinkles of rain that have been helpful. Outlook for soybean crop looks much more favorable than for corn. Very small amount of grasshopper damage. This where fields adjoin meadows and pastures. As yet very little sign of disease damage. Hot, dry weather tends to retard disease attack, especially brown stem rot. Would expect growers to make effort to store more beans on farm.

Gilbert F. Smith, Mahomet, for east central: Maturity 1 week late. Severe drought. No rain in 6 weeks. Temperatures 90-100 degrees for 15 days. Total yield 35% less than 1946. 50% damage possible by earlier-than-normal frost.

Lamson Bros. & Co., in Chicago Journal of Commerce for Bloomington: (Aug. 23) Bean fields standing heat and drought remarkably well, but heavily infested with grasshoppers, which have destroyed too many blooms. *For Quincy:* No particular deterioration yet. Crop standing still last 2 weeks. Early beans coming into bloom. With very late frost could have fair crop. *For La Salle:* Early planted beans have blossomed and are podding very well and condition is excellent with no signs of dry weather damage. Late planted beans are just starting to blossom and has been some mention of some falling off of blossoms which will result in poor podding. On whole, beans are good to excellent, with ensuing weather the big factor.

H. I. Cohn, Valley Farms, Greene County, Ill., for west central: (September 2) Maturity earlier than normal due to drought. Hot winds over past 3 days have cut yield prospects tremendously. Expected per acre yield one-half of normal.

INDIANA

J. B. Edmondson, Danville, for south central: Maturity about 10 days late. Large acreage planted around June 15 now has beans forming in pod. These have gained considerable time and will mature with fairly late frost. Growth of late beans remarkable due to abundant moisture and humid weather through August. At no time has this area suffered for moisture. Total yield close to normal. Early fields (May 15-25) weedy, damage minimum due to abundant moisture. Later plantings need only time to mature an excellent crop. No pod and stem blight showing up yet. Wide scattering, not too serious, of bacterial pustule and bacterial blight. Probably 30-40% would be damaged by earlier-than-normal frost. We just don't count on that early frost. We have enough to worry about as it is. Farm storage bins carrying a lot of wheat, held for feeding. If prices remain favorable at harvest time, probably 10% fewer beans will be stored on farms than last year. Farmers jittery about price structure. A stabilized price would help greatly.

K. E. Beeson, Indiana Corn Growers Association, Lafayette: (Aug. 25) Maturity slightly later than normal but soybeans are demonstrating their inclination to shorten growing season when planted late. Varieties are podding though vegetative growth may be reduced. Variable moisture, but generally dry in Indiana, and unusually hot for August. Grasshoppers more abundant than usual. Common diseases — downy mildew, septoria, bacterial blight, some frog eye, and tip blight are showing. Some potash and manganese deficiencies. On droughty soils, soybeans are severely damaged.

Peter J. Lux, State PMA, Indianapolis: Maturity well along in most sections. Soybeans stood the drought well in all sections. Recent rains all over state. Total yield should exceed 1946 production if conditions continue favorable. Very little disease or pest damage reported except for grasshoppers in some sections. Little general change in farm storage situation. Many structures badly in need of repairs.

Lamson Bros. & Co., in Chicago Journal of Commerce, for Richmond: (Aug. 23) Bean crop never looked better in this territory. We are not suffering drought, only heat.

USDA Weekly Weather and Crop Bulletin: (Aug. 26) Soybeans excellent progress in central, good in south, and fair to poor in north.

IOWA

Fred Hawthorn, Castana, for western: Maturity 10 days late. Very dry. No important rain since July 5. Lower leaves died and dropped off. Total yield 50% of 1946.

H. E. Hazen, State PMA, Des Moines: (Aug. 25) Maturity 3 weeks late. Extreme drought has hurt all over, especially in southern one-half of state. Total yield 20% less than 1946. Considerable damage from grasshoppers and web worm. Early frost could catch 25% of beans before complete maturity. 20% more of crop will be stored on farm than in 1946 due to short corn crop.

Howard L. Roach, Plainfield, for northeast: (Aug. 25) Maturity 10-15 days late. Weather very dry. Expected per-acre yield 75% of normal. Possibly 25% damage by earlier-than-normal frost. Will be 15% more farm storage of beans than in 1946.

Lamson Bros. & Co., in Chicago Journal of Commerce for Waterloo: (Aug. 23) Beans on light soil badly damaged, even on good soil not filling good. Some elevators expect to handle only one-third to one-half as many beans as last year. *For Des Moines:* Early planted beans coming along all right, but late beans being hurt, just like the corn. Some bean blossoms fall account of heat. *For Cedar Rapids:* Opinion here is bean crop has suffered because of drought. Pods are not filling out and damage around 40%.

USDA Weekly Weather and Crop Bulletin: (Aug. 26) Some firing of soybeans;

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...SAME PRODUCTS!
...SAME PERSONNEL!

Announcing a new Corporation

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KANSAS SOYA PRODUCTS CO.

INCORPORATED

Emporia Kansas **Kansas City, Kansas**

Formerly operating as
The Kansas Soybean Mills, Inc., Emporia, Kans.
The Kansas Soya Products, Inc., Kansas City, Kans.

The officers and directors of the companies being merged will be identical in the new company. The main office will remain at Emporia.

Ted W. Lord, President
Richard W. Lord, Vice President and Treasurer
Philip R. Lord, Vice President and Secretary

Soybeans need rich soil and lots of nitrogen. Inoculating the seed with NITRAGIN legume bacteria helps to supply this element at a cost of only a few cents an acre. NITRAGIN inoculation helps crops to a faster start . . . gives plants more vigor to fight weeds and drought . . . helps boost yields, frequently up to 50%. Don't take chances when you plant soybeans . . . inoculate every planting with NITRAGIN.

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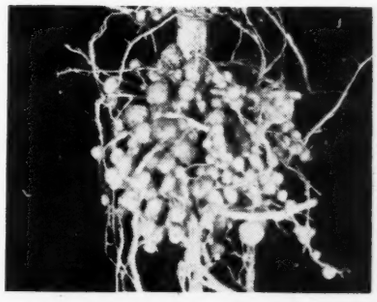
Farming authorities recognize the soil building value of properly inoculated legumes. But don't rely on last year's bacteria. Experience has shown you can't depend on inoculation from previous crops. Help grow better legumes and save soil by inoculating every planting with fresh NITRAGIN.



Half of this thirty-acre field of red clover was inoculated with NITRAGIN. It cost only 75¢ and produced extra seed worth $390.00.

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Get these booklets—they tell how to grow better legumes . . . how inoculated legumes produce better stands, bigger yields and richer feed . . . how they boost soil fertility. Send today for your copies.

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Inoculate All Legumes With NITRAGIN

NITRAGIN is the most widely used commercial inoculant in the world for clovers, alfalfa, soybeans and other legumes. Farmers have used it for nearly fifty years and every year its use increases. NITRAGIN scientists conduct extensive laboratory and field tests to assure—and continually improve—the quality of NITRAGIN legume bacteria.

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crop continues to bloom; pod set fair; three-fourths of acreage showing pods.

KANSAS

E. A. Cleavinger, extension service Kansas State College for eastern: (Aug. 26) Beans may be a few days later than usual but not much. Drought during July and August, rains Aug. 15-16. Total yield 90% of 1946 due to lower acreage and somewhat lower acre yield. Webworm in June and early July accounted for lower acreage. Earlier-than-normal frost would do considerable damage.

MINNESOTA

John W. Evans, Montevideo, for southwest: Maturity position improved. Many fields showing well filled pods. Weather conditions good. Expected per acre yield 100% of normal.

R. E. Hodgson, Waseca, for southeast: (Aug. 25) Maturity normal to week late. Nice 2¼-inch rain has pepped conditions up. I estimate a small increase in total yield in this immediate locality. Adapted varieties should be safe from frost in another month.

USDA Weather and Crop Bulletin: (Aug. 26) Soybeans withstood drought. Average good.

MISSOURI

Harry A. Plattner, Malta Bend: (Aug. 25) Early planted beans will yield well if rain comes within a week. Late planted are a question at the present time. Rain needed. 70% beans late planted. Total yield below 1946. 15% disease and pest damage. 30% damage by frost if before Oct. 15.

USDA Weather and Crop Bulletin: (Aug. 26) Soybean condition holding well at about three-fourths of normal.

E. M. Poirot, Golden City for southwest: (September 7) Weather very dry. Leaves dropping from bean plants. Total yield one-half of 1946.

NEBRASKA

John L. Weihing, College of Agriculture, Lincoln, for eastern: (Aug. 25) If this area receives rain, maturity will probably be delayed until frost. If it remains dry, maturity will be ahead of schedule. Temperatures considerably above and moisture below normal. Yields will be markedly lowered this year, but with over a month left in growing season, it is difficult to state the amount.

NEW YORK

Wm. D. Bair, agricultural statistician, Albany: (Aug. 26) Maturity 10 days later than normal. Soil moisture now ample in much of area, becoming dry, however, in eastern and northern. Hot and humid. Total expected yield one-third less than 1946. More than normal frost hazard.

OHIO

G. G. McIlroy, Irwin, for central: (Aug. 25) Good favorable weather of past 4 or 5 weeks has brought about a terrific change in corn and soybean crops. Now it appears we may have a normal bean crop and 70% of a corn crop if frost does not come before Oct. 15. Possible 10% damage by earlier-than-normal frost.

Ersel Walley, Walley Agricultural Service, Inc., Fort Wayne, Ind., for northeast Indiana and northwest Ohio: (Aug. 25) Half of crop 10 days late, other half 20 days late. Moisture and weather conditions ideal in some localities, others poor but generally good. If frost is 3 weeks late crop may exceed 1946. Earlier-than-normal frost could cut crop in half. Since oats bins are empty many more beans could be stored on farm than in 1946. Depends on price at harvest time.

W. G. Weigle, Marsh Foundation Farms, Van Wert, for northwest: All soybeans look much better than they did July 1. Warm weather in August has helped late beans to catch up somewhat—now only 10 days behind in maturity. Total yield 85% of 1946. Some increase in acreage, but some fields are weedy and some thin stands. Early frost would damage 50% of acreage in this section. Some grasshopper damage. Plenty of storage due to short oats crop.

SOUTH DAKOTA

H. G. Miller & Sons, Garden City, for Clark County: (Aug. 30) Maturity about 10 days later than normal. Less than 1 inch of precipitation in July and August. Hard to estimate yield yet but would say it will be considerably less due to long dry period in growing stage. Generally speaking would say outlook for a good crop not as good as normal.

VIRGINIA

H. M. Taylor, State Department of Agriculture, Richmond: (Aug. 26) Late start rapidly overcome in July. August too dry for best growth. Late sown crops backward. Hot and dry in eastern and southeastern which produce most of beans. Total yield 5% over 1946.

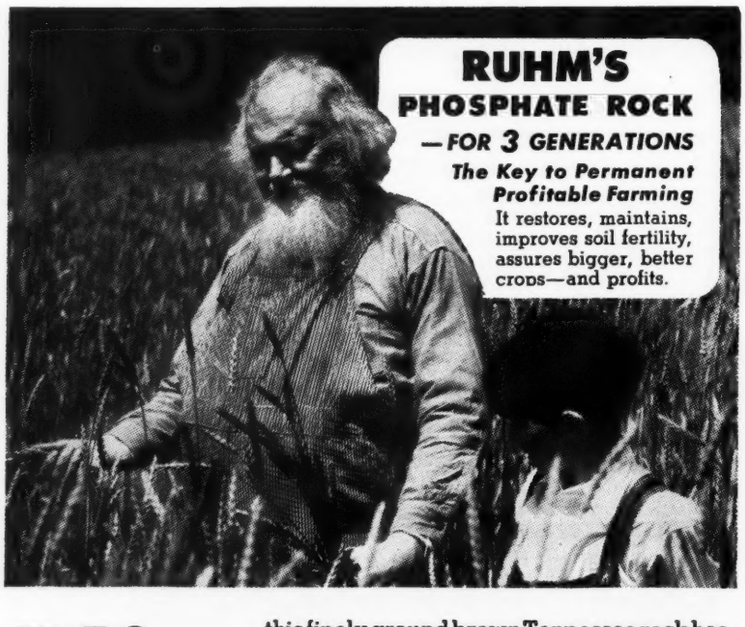
WISCONSIN

Geo. M. Briggs, Agricultural College, Madison: Soybeans have made good growth, but hot spell caused dropping of blossoms in some sections. This means pods higher up on stalk. Crop is later and needing more time before frost. 40% possible damage by earlier-than-normal frost.

John P. Dries, Saukville, for southeastern: Maturity 2 weeks late. Moisture conditions very good, not too much drought damage. Total yield equal or better than 1946 depending on how early frost may arrive. 75% would be damaged by earlier-than-normal frost.

SOYBEANS FOR BEANS
(USDA Crop Report August 1)

State	Average 1936-45	1946	Indic. 1947
	—Thousand Bushels—		
Ohio	13,423	16,254	13,712
Indiana	16,294	25,346	24,463
Illinois	50,239	75,036	67,460
Michigan	1,248	1,290	962
Wisconsin	410	412	299
Minnesota	2,025	10,675	14,880
Iowa	20,115	34,960	32,526
Missouri	4,194	14,360	14,467
Kansas	1,070	2,178	2,424
Virginia	832	1,106	1,162
North Carolina	2,219	2,862	2,990
Kentucky	583	1,566	1,120
Tennessee	378	810	900
Mississippi	806	1,050	1,395
Arkansas	1,787	5,458	4,950
Other States	2,263	3,362	4,196
United States	117,886	196,725	187,906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The Key to Permanent Profitable Farming
It restores, maintains, improves soil fertility, assures bigger, better crops—and profits.

FOR 50 YEARS (1897—1947) this finely ground brown Tennessee rock has been recognized as the best, most effective, longest lasting, lowest cost natural soil food. Shows results first crop and following crops.

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You saw, at Columbus, the house which had been painted with ***Sta-Par!** You inspected it carefully, you noted results. And you approved, **unanimously!**

You'll want *Sta-Par for your own usage. It is ready for your orders — at the remarkable price of only

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See your paint dealer. If he cannot supply you, send your order direct.

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GRITS and FLAKES... FROM THE WORLD OF SOY

Skellysolve Industrial Naphthas, a new booklet by the solvents division of Skelly Oil Co., shows views of equipment used in production of special napthas and indicates some of the progress in the petroleum industry in utilizing these napthas. It may be had by writing Skelly Oil Co., Kansas City 10, Mo.

* * * *

"Flavor Reversion in Soybean Oil," is an article by Calvin Golumbic and B. F. Daubert of the University of Pittsburgh, in August *Food Industries.*

* * * *

Dr. Iver J. Johnson, who has been closely associated with Prof. H. D. Hughes the last 8 years is the latter's successor as head of farm crops at Iowa State College.

* * * *

Almon G. Hovey, with 25 years' experience in technical resins including 3 years with General Mills, Inc., has been appointed in charge of the firm's technical sales service of the chemical division, at Minneapolis.

* * * *

Sprout, Waldron & Co., manufacturing engineers of industrial processing equipment, Muncy, Pa., announces a new eight-page bulletin, illustrating and describing a wide variety of equipment used in the processing industries.

* * * *

Monsanto Chemical Co., Seattle, has awarded the first construction contract for its soy flour and wood preservative plant. Four steel frame, brick buildings, which will cost $700,000, will be completed by the end of 1947.

* * * *

Mass production of two types of lecithin from soybean oil for use in the tanning of leather was announced recently by A. E. Staley Mfg. Co., Decatur. The product retards oxidation and rancidity.

* * * *

How General Mills Grew Last Year is the 19th annual report of General Mills, Inc., and covers the year ending May 31. General Mills soy products including lecithin and polyamide resin, the chemical plant at Kankakee, Ill., and soybean processing and oil refining plant at Belmond, Iowa, are mentioned.

* * * *

Three new salesmen for Val-A Co., Chicago, are Malcolm G. Ward for western Michigan: Arnold Esse, eastern Michigan; and H. A. Carlson, northern Illinois.

* * * *

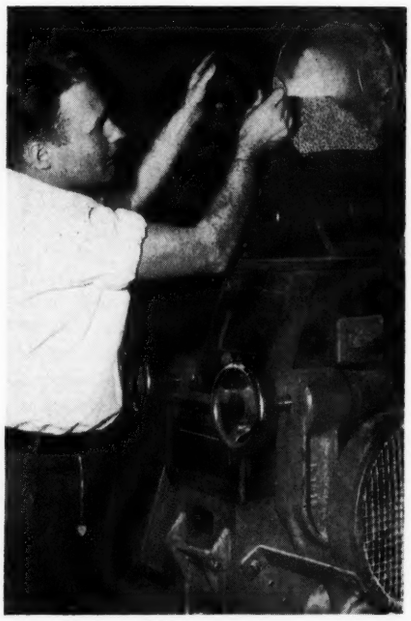
The Ohio Valley Soybean Cooperative, Henderson, Ky., is making extensive additions to its plant including a laboratory, new office space, a warehouse and an assembly hall. The mill has taken over the site of the Boyle Grain Co., adjacent.

* * * *

Harry C. Schaack, 60, former president of the Chicago Board of Trade, died July 28 of a heart attack in the office of Shearson, Hammill & Co., stock brokers, where he was a registered representative in the grain department.

* * * *

H. G. Badami, a director of a large vegetable oil mill in Bombay, Ind., recently inspected the soybean processing plant of Delphos Grain & Milling Co., Delphos, Ohio. He was much interested in the methods of the Delphos people.



W. H. GOSS pours soybeans into flaking machine at the Northern Regional Laboratory.

GOSS GOES TO PILLSBURY

Warren H. Goss, well known authority in the soybean and oil processing industries, has been appointed associate director of the research and products development department, Pillsbury Mills, Inc., Minneapolis.

Goss comes to Pillsbury from the Northern Regional Research Laboratory of the U. S. Department of Agriculture at Peoria, Ill., where he became assistant to the director in 1946 and has been recently in charge of market and product development. He is the author of a book soon to be published, *The German Oilseed Industry,* and co-author of another book, *Soybean Chemistry and Technology.* He has written many technical and semi-technical articles.

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GUARANTEED DELIVERIES — SPOT OR 4th QUARTER

'NU-SEME' BAGS

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WILL SAVE YOU UP TO $1.50 PER TON

Only the top grade used bags are selected for NU-SEMING. The old seam and rough edges are completely covered — thus strengthening the seam and making an attractive package.

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They Are Good Sound Bags — Reversed and Cleaned

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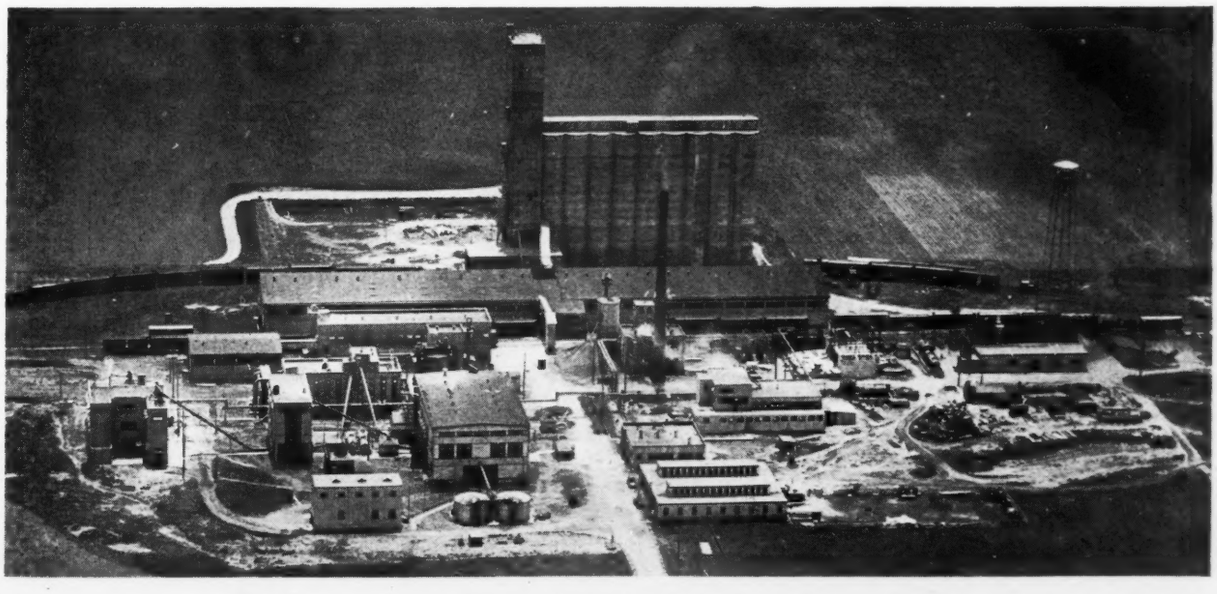


Precision Process Soybean Oil Meal, AAA-1 Soybean Oil, Industrial Proteins, Plastic Molding Compounds, Azlon Fiber

These varied products produced on a low-cost, efficient basis help to assure growers and elevator men a ready market for their soybeans.

Cincinnati
Kirby 6670 - 7988

THE DRACKETT COMPANY

5020 Spring Grove Ave.

A. G. Hopkins, president of Mrs. Tuckers Foods, Inc., Sherman, Texas, announces that his firm will build a new refining and bleaching plant just north of its main property at Sherman.

* * * *

"The Flavor Problem of Soybean Oil, I. A Test of the Water Washing-Citric Acid Refining Technique," by H. J. Dutton, Helen A. Moser and J. C. Cowan; and "Performances of Approved Chemists Handling Commodity Credit Corporation-Processor Soybean Analysis Work," are articles in August *Journal of the American Oil Chemists' Society.*

* * * *

H. D. Egly, president and managing director of Victory Mills, Ltd., Toronto, has been appointed a director of Purity Flour Mills, Ltd., also of Toronto.

* * * *

A $225,000 fire destroyed the soybean plant of the Boone Valley Cooperative Association at Eagle Grove, Iowa, August 23. Loss included about $75,000 worth of soybeans and oil. Officials said the fire apparently started from spontaneous combustion at the top of the plant.

* * * *

New address of Dearborn Motors Corp. is 15050 Woodward Ave., Detroit 3, Mich. The firm makes Ford tractor and Dearborn farm equipment.

* * * *

A new solvent extraction soybean processing plant is under construction by Muscatine Processing Corp., Muscatine, Iowa.

* * * *

Dr. L. J. Norton, agricultural economist of the University of Illinois, attended the International Conference of agricultural economists in London August 27 to September 7.

* * * *

The Big Four Cooperative Processing Association, Sheldon, Iowa, closed its plant for the season in August after processing 600,000 bushels of soybeans during the past year.

* * * *

Spencer Kellogg & Sons, Inc., has announced the appointment of Harold M. Engel as sales representative for soybean and linseed oil meals, with headquarters at Buffalo.

* * * *

Haynes Milling Co., Portland, Ind., recently acted as host to dealers of the area at the firm's sixth annual banquet. Speakers included Clarence E. Peters, president and general manager of the firm, Richard Kessler and C. D. Alexander, manager of the Bemis Bro. Bag Co., Indianapolis.

* * * *

Walter W. McLaughlin, president of the American Soybean Association, is on the committee in charge of the All-Illinois "Looking Ahead with Agriculture Conference" at Decatur, Ill., Sept. 19-20. Among speakers are A. E. Staley, Jr., Decatur; and Drs. L. J. Norton and G. L. Jordan of the department of economics of the University of Illinois.

Goss undertook an investigation of the German oilseed industry on behalf of the Joint Chiefs of Staff. The mission yielded information of great value to oilseed processors and oil refiners in the United States.

Goss, born in Portland, Ore., graduated from the University of Washington with a B.S. degree in chemical engineering in 1933. He joined the National Bureau of Standards in Washington, D. C., where he performed electrochemical research. In 1937, he joined the staff of the U. S. Regional Soybean Industrial Products Laboratory at Urbana, Ill.

When the chemical and engineering sections of the Urbana laboratory were transferred to Peoria in 1942 and absorbed by the Northern Regional Research Laboratory, Goss served as head of the oilseed section of the engineering and development division.

—s b d—

GLIDDEN CHANGES

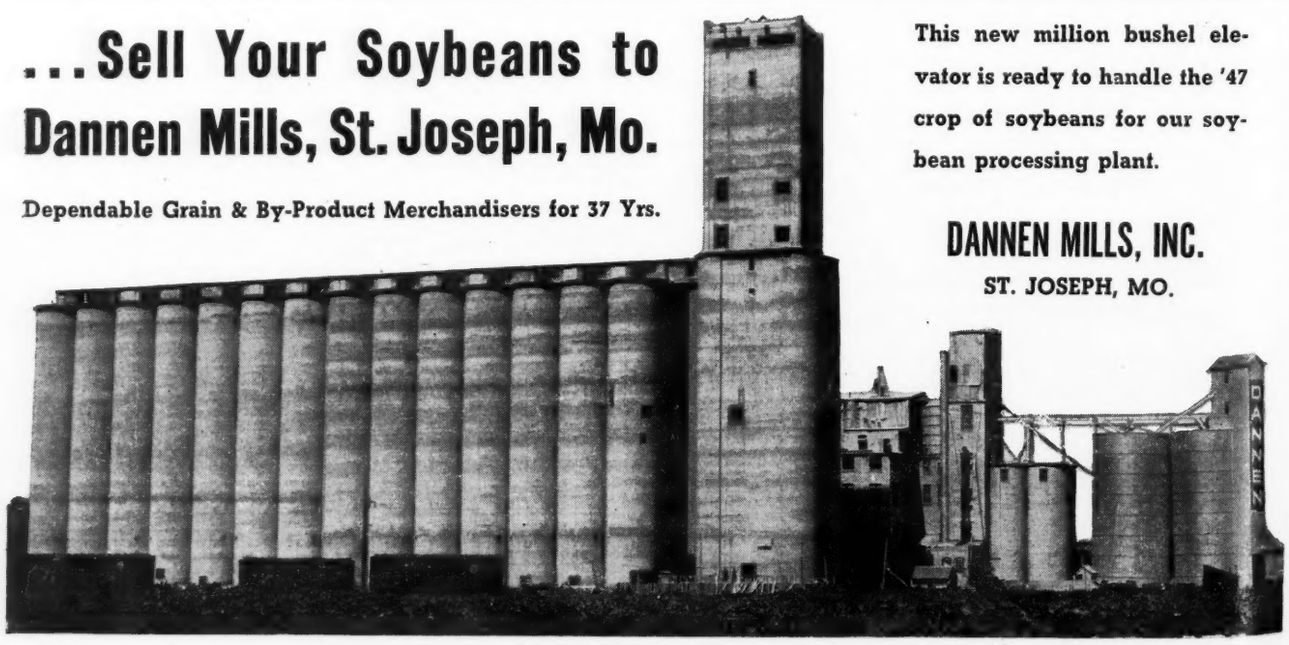
GOLSETH

SPRAGUE

Above are men recently advanced by the Glidden Co. At left is Ralph G. Golseth, who has been elected a vice president of the Glidden Co. Mr. Golseth will assume full responsibility for the firm's soya products division in Chicago as well as the feed mill division at Indianapolis. At right is Paul E. Sprague, a vice president, director and member of the executive committee, who has been appointed assistant to the president, Dwight P. Joyce.

...Sell Your Soybeans to Dannen Mills, St. Joseph, Mo.

Dependable Grain & By-Product Merchandisers for 37 Yrs.



This new million bushel elevator is ready to handle the '47 crop of soybeans for our soybean processing plant.

DANNEN MILLS, INC.

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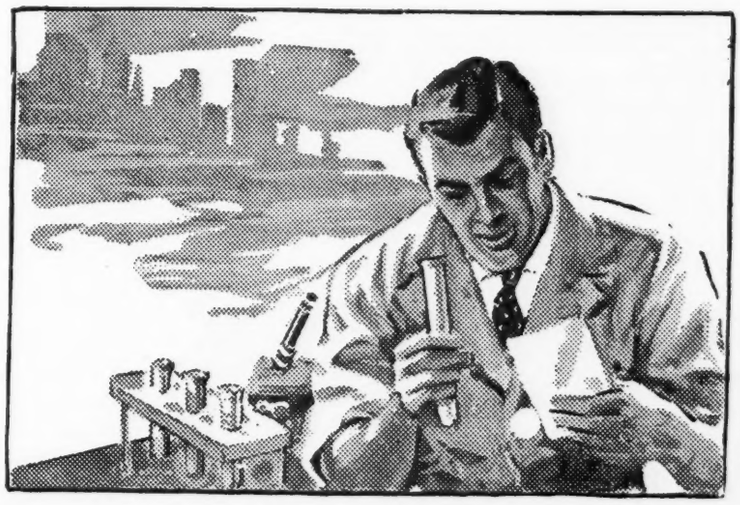

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WASHINGTON Digest

By PORTER M. HEDGE

Washington Correspondent for
The Soybean Digest

Export Controls Pressures are building up here again to remove export controls on fats and oils—but with small hope of success.

A majority of the industry representatives at the August 25 fats and oils conference in Washington recommended immediate removal of export controls.

A few industry representatives were neutral.

Soybean crushers, however, opposed removal, fearing that this might result in export of whole beans, and reduce the supply for processing.

The export control law expires next February. The Administration could remove fats and oils from export controls at any time.

But there is every indication that the government agencies most concerned—the departments of agriculture, commerce and state—will not only keep fats and oils under export control until February, but use their influence to have the controls extended at least for another 6 months.

However, more liberal allocations of fats and oils for export—particularly lard—definitely are in prospect.

The Administration argues that it needs these controls to govern the destination of exports. It doesn't want to give them up until it knows what the food requirements will be under the Marshall plan for reconstructing Europe.

Moreover, it fears a kickback from producers if controls should be dropped in mid-season—as price controls were last October.

The prospect of a much smaller lard output next year, the certainty of a feed shortage, and the prospect that Europe will be in more desperate straits for food next spring and summer than at any time since the end of the war, all indicate the likelihood of export controls being continued by Congress.

Even packer representatives in Washington, who have been among the most vocal of those demanding removal of controls now, look for export controls to be extended.

Crops and Weather The unusual weather pattern in the Cornbelt this year—too much rain last spring, too little rain this summer—has bestirred government agencies into belated action to learn more about the effects of the weather on crops.

This is the science of "agricultural climatology," which is still in its infancy in this country. It involves the precise measurement of the effects of weather on yield and quality of crops at critical stages of plant growth.

This information is called "phenological data." Crop-weather scientists, for instance, say it should be possible to predict the oil content of soybeans before harvest. But "phenological data" for soybeans first will have to be obtained through basic research.

Surprisingly little information of this nature is available in the United States.

Pioneer work on corn—which has shown that it takes an average of 51 days between silking and denting, regardless of weather—has been conducted by the U. S. Weather Bureau in Iowa in cooperation with the Iowa Department of Agriculture.

Experimental studies on soybeans have been started by the Iowa Agricultural Experiment station, under direction of H. C. S. Thom, chief of the Iowa Weather Bureau.

Crop-weather research projects were set up in the Department of Agriculture in 1938 for cotton, winter wheat, spring wheat, and corn. Funds were cut off at the start of the war, and have not been restored.

But failure of the corn crop this year has given crop-weather research somewhat of a new lease on life.

Expansion of crop-weather research with part of the Hope-Flannagan funds appropriated for agricultural marketing research is being discussed.

For the first time, the Crop Reporting Board this year has started to collect corn silking data in the major corn producing states to get an idea before harvest of corn maturity and probable frost damage.

This data is being supplemented this year with more detailed studies of corn maturity as the season advances.

In addition, the U. S. Weather Bureau is making detailed studies of the probability of the first killing frost in the fall for representative Cornbelt areas.

When compiled, the Weather Bureau data will show the probability, or percentage risk, of the first 32, 30, and 26 degree temperatures in the fall.

The data may not be completed in time to be of much practical use to soybean growers this year, but it should be helpful in later years in planning fall operations.

Prospects for Feeds The Department of Agriculture is bracing itself for a feed shortage next year more severe than in 1944.

Official crop reports indicate that the supply of corn for feed will be only a little better than in the 1934 drouth year.

In that year, there were 12.7 bushels of corn for each grain-consuming animal unit. This year, it looks as though the supply of corn would be near 16 bushels per unit—making no allowance for lower quality and a bigger than usual percentage hogged off, cut for silage and fodder.

The corn supply for the current feeding year is about 19½ bushels per animal unit.

The prospective sizeable increase in the

supply of protein meals this year will help to ease the feed shortage.

The supply from this year's oilseed crops is tentatively estimated at a little better than 6.3 million tons, compared with 5.8 million tons a year ago.

There is a much bigger supply of alfalfa meal on hand than a year ago.

If oilseed production turns out about as now expected, some increase in protein meal exports is probable next year, despite the short feed supply.

Exports of all oilseed cake and meals so far this calendar year amount to approximately 152,000 tons.

For Foreign Shipment

Twenty-two and a third million pounds of soybean oil have been allocated by USDA for immediate export against tentative 4th quarter allocations to eight countries.

Here is the breakdown by countries, in millions of pounds: Czechoslovakia 2.2; Canada 3.3; France 3.3; The Netherlands 3.3; French Colonies 2.2; Latin America 2.5; Denmark 3.3; Norway 2.2. Total allocation 22,300,000 pounds.

Recent supplemental allocations and replacements include:

To France 9,025,000 pounds of soybean oil, advanced against 4th quarter allocations.

To the Republic of Colombia 228,000 pounds of soybean oil, partly in exchange for copra.

To the Philippines 300,000 pounds of soybean seed for planting.

To Greece 500 tons of protein meal.

Price Support

Here are the major provisions of the 1947 soybean price support lending agency agreement:

1. Processors must pay price support to producers to be eligible for loans, and purchase no more than their crushing requirements to October 10, 1948.

2. Private lending agencies must advance their own funds to processors on security of soybeans, and at values determined on the basis of support prices. Loans will be at 3 percent interest, and be payable on demand, or August 1, 1948, whichever is earlier.

3. Half of the interest collected by the lending agency shall be remitted to Commodity Credit Corporation. CCC will take over loans on request of a lending agency.

4. Any soybeans bought by processors and put under loan shall be purchased by CCC on written request, made not later than August 1, 1948.

5. CCC may request certification from processors of the amount of unsold soybeans under loan, and may require processors either to sell to CCC the unsold beans, or to repay all loans on them.

Market Street

We invite the readers of THE SOYBEAN DIGEST to use "MARKET STREET" for their classified advertising. If you have processing machinery, laboratory equipment, soybean seed, or other items of interest to the industry, advertise them here.

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ATOMIC BOOKLETS—Historical Data on The Atom, Educational, 50 cents; 12 Booklets $3.85. Address remittance to: David Nichols & Co., Rockmart, Ga.

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30—42,000 Gal. Cap. 29'8" x 8' Vertical
10—126,000 Gal. Cap. 29'8" x 24' Vertical
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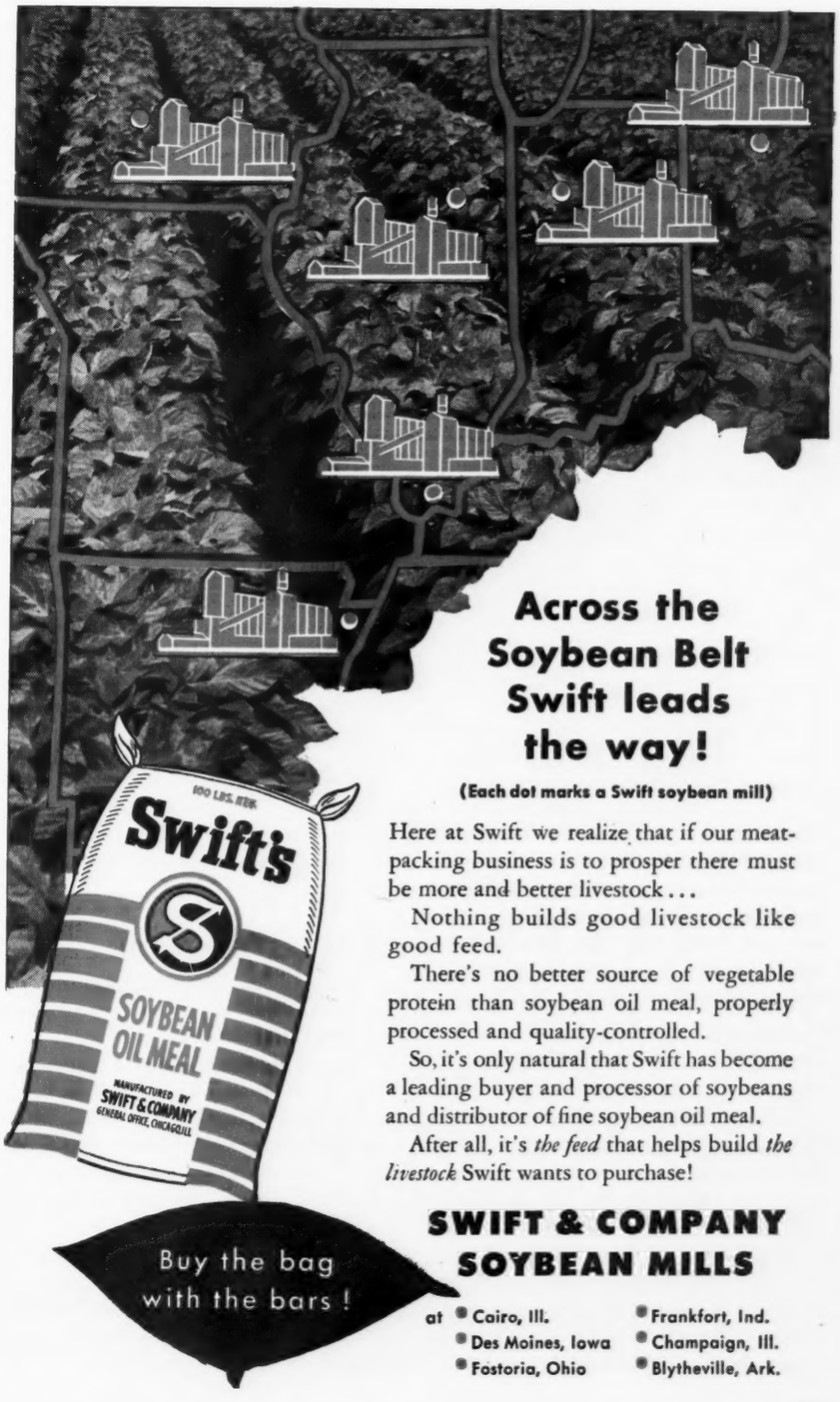

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ASKS LIBERALIZED EXPORTS

The following statement was presented by Walter W. McLaughlin, president of the American Soybean Association, before the fats and oils conference of industry and government representatives in Washington, D. C., August 25. The conference, called to consider the fats and oils situation and the government's export policy for 1947-48, is reported at greater length by Porter M. Hedge in the "Washington Digest" column on page 82. Said McLaughlin:

At present the shortage of fats and oils is worldwide. Before the war China was growing approximately 200 million bushels of soybeans per year, and Manchuria was second with an annual production of 150 million bushels per year. Since the war this production in Asia has been greatly curtailed, and the United States has taken first place in soybean production, producing close to 200 million bushels (196,725,000) last year. It is estimated that over 60 percent of the protein meal and over 50 percent of the vegetable oil of our nation now comes from soybeans.

Soybean oil is now selling at half the price it sold for four months ago. The amount of lard in storage has more than quadrupled since August, 1946.

It would seem that this meeting today of representatives of all associations representing the fats and oils industry is a highly important meeting. A definite contribution should be made to help find the right solution for the establishment of our export policy for the 1947-48 season.

The first responsibility of the American Soybean Association is to the grower of soybeans. It is our responsibility to protect the interests of that grower. In so doing, we must consider not only the immediate problem, but also the long time effects of any policies which might be established. The growers feel a close allegiance to the processors because they provide the market for our crop. We also have much in common with the cotton farmers, and with the other producers of domestic fats and oils. It is my hope that if the right policy can be established, that it will work no undue hardship on any group.

OCTOBER FIASCO

Our soybean growers had a terrible shock last October when the price ceiling was suddenly removed without warning, and the price of beans shot up to above $3.00 per bushel, after most of the crop was out of the growers' hands. That action never has been explained to the satisfaction of the growers in my section of Illinois who had marketed 90 percent of their beans before the price was raised. Soybean growers are greatly handicapped by lack of adequate storage space for their bean crop. Most every grain farmer has a corn crib where he can store his corn at time of harvest, and market it in a more or less orderly manner, but only a small percent of the farms have storage space for beans. The production of beans has increased around 400 percent in the past 10 years, but there has been very little increase in storage capacity, and it just does not make sense for the bean growers to dump so many beans on the market within a few weeks. It isn't fair to the processors. It is not fair to the railroads, and it certainly isn't orderly marketing. It is my opinion that this storage problem will be solved by the growers themselves, just as soon as building materials become available at prices that are within reason. Processors can help encourage this building of storage space, by the establishment of a graduated price scale for beans stored on the farm.

EXPORT SOME WHOLE BEANS

Now, in regard to our export policy we fully realize that there may be complications due to the foreign relations policy of our government, but it seems that at a similar meeting of this group on June 10th that you were all agreed to the removing of restrictions on the export of protein meal. I believe that today as a representative of the growers, that we are ready to go a step farther and recommend the liberalization of allocations for the exportation of soybean oil, and as a last step if it were in harmony with the policies of the government, we might be willing to go along on recommending that in the establishment of this quota for export that provisions be made for the exportation of a limited quantity of soybeans.

If exports of all three commodities are liberalized, it is our opinion that there would be no great quantity of whole beans exported, but it might strengthen the price of domestic beans enough to justify such a policy.

—s b d—

NEW SOYBEAN OIL

A new edible virgin oil derived from soybeans is announced by Soya Corp. of America, New York City firm.

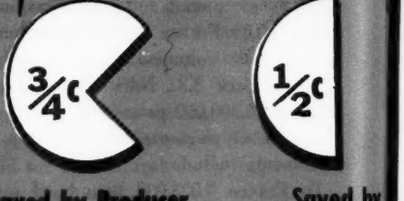
The corporation, according to President Armand Burke, has developed in its laboratories and will shortly market in commercial quantities the new product, which is produced from soybeans pressure cured by the "Horvath process," patented by the Soya Corp.

The new product has a delicate nut-like flavor completely different from the commonly known refined soybean oils, Mr. Burke said. Unlike most soybean oil, it has a long shelf life free from rancidity.

CASE HISTORY No. 18

One in a series of factual experiences of a group of American manufacturers with Multiwall Paper Bags.

TOTAL AMOUNT SAVED (PER LB.)



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In The MARKETS

OIL MEAL FIRM; BEANS AND OIL LOSE GROUND IN AUGUST

A decline in soybean oil prices featured August markets.

A general easiness in fats and oils offset the bull market in corn. The cash and futures markets in soybeans followed oil to lower levels.

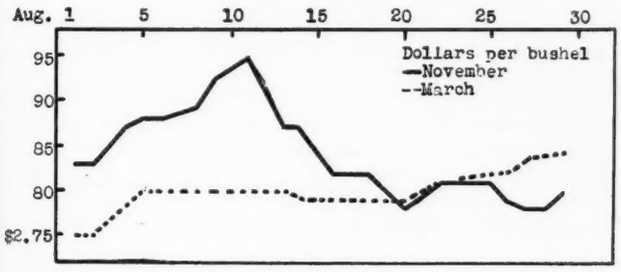
But oil meal prices held steady all month. The rise in the corn price and expectation of a late maturing soybean crop caused buyers to reach out for new crop meal.

Reasons for the decline in oil included the expected larger supplies of oilseed, cakes and meals for 1947-48 due to larger cotton and flax crops, and smaller oil exports. Domestic disappearance has been large but not exceptional.

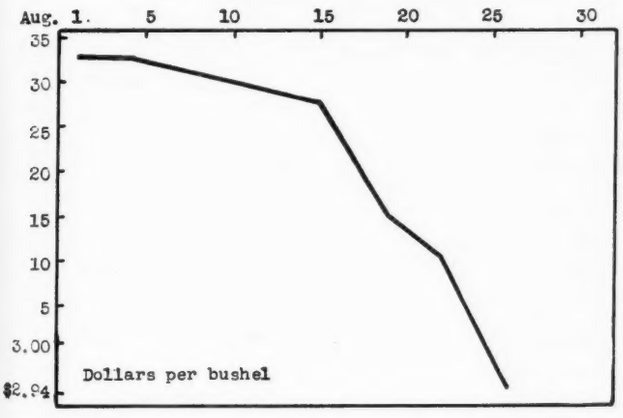
A burst of activity featured soybean and oil meal futures markets during the second and third weeks of the month. Also there were some large purchases of soybean oil at the lower levels. Markets were generally dull at the month's end.

Country movement of soybeans was very light with only a few

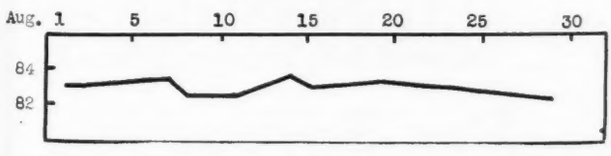
No. 2 SOYBEANS, CHICAGO FUTURES



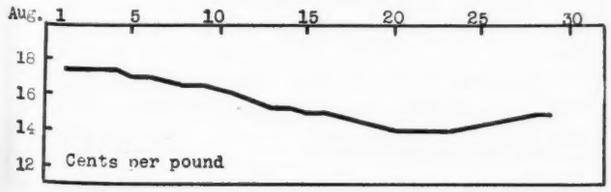
No. 2 SOYBEANS, CHICAGO BIDS



BULK SOYBEAN OIL MEAL, DECATUR BASIS
(Dollars per ton)



CRUDE SOYBEAN OIL, TANKERS, F.O.B. DECATUR



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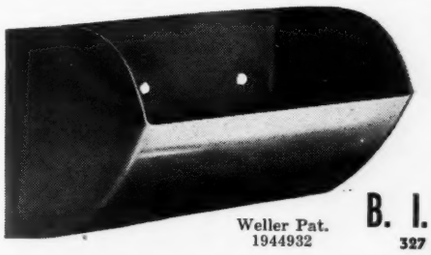

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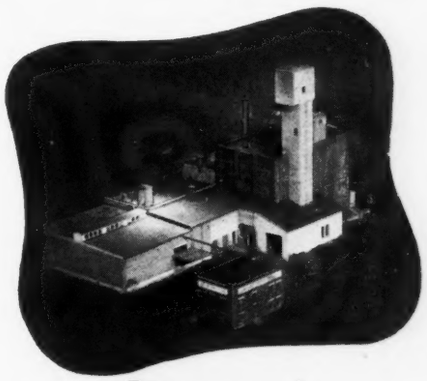

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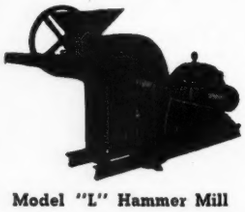
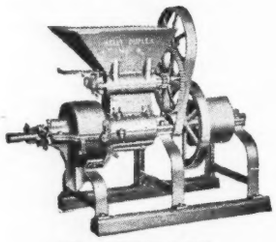


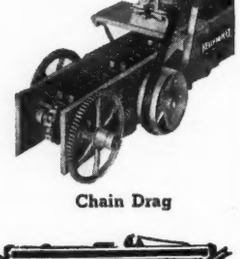
Model "L" Hammer Mill

Model "M" Hammer Mill

Crusher and Feeder



No. 4 BURR MILL



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cash sales on the Chicago market. Production of soybean oil meal dropped off as soybean supplies became exhausted.

High point on November No. 2 soybean futures on the Chicago market was $2.95 August 11. November futures were being quoted at $2.78 August 28. Cash No. 2 soybeans in Chicago eased off from $3.33 the first of the month to $2.96 August 26.

Bulk oil meal Decatur basis held closely to the $83-a-ton level all month. Crude oil in tankers F.O.B. Decatur declined from 17-1/3c August 1 to 14c August 20. Oils strengthened somewhat after the government-industry meeting to view the fats and oils situation August 25. (The meeting is reported on the "Washington Digest" page in this issue.) Soybean oil regained 1c by August 28.

In the grains and feedstuffs group, soybean oil meal remains second only to corn in a comparison with prewar price relationships.

• STOCKS OF SOYBEANS. Soybeans stored in all positions both on and off farms on July 1, 1947 amounted to 40 million bushels, the Bureau of Agricultural Economics reports. These stocks include: 6¼ million bushels on farms and 3½ million bushels in interior mills, elevators and warehouses and other establishments, as estimated by the Crop Reporting Board; about 28 million bushels in processing plants as enumerated by the Bureau of the Census; and over 2¼ million bushels reported as commercial stocks at terminals by the Production and Marketing Administration. Total stocks are about 10 percent higher than a year ago, but otherwise are less than for the same date on any of the 5 years of record.

Stocks on July 1, readily accessible to processors, are larger than last year and for the remainder of the year should be sufficient to crush at a rate as high as for the period July 1 to October 1, 1946, but not at the high rate that has been maintained from October 1, 1946 to July 1, 1947.

STOCKS OF SOYBEANS IN INTERIOR MILLS, ELEVATORS, AND WAREHOUSES*

July 1, 1947, By States, With Comparisons

State	July 1 1946	April 1 1947	July 1 1947
	— Thousand Bushels —		
Ohio	320	985	280
Indiana	290	1,449	122
Illinois	1,443	10,031	1,308
Michigan	15	**	18
Minnesota	43	611	168
Iowa	1,158	5,694	1,371
Missouri	68	**	56
Kansas	19	47	14
Virginia	13	48	14
North Carolina	5	28	1
Mississippi	11	25	1
Arkansas	7	**	0
Other states	134	715	144
United States	3,526	19,633	3,497

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For Soybeans

- **Proven Efficiency**
- **Low Price**

Also Patented UNICULTURE for Clover and Alfalfa . . . 3 Cultures in 1 Can.

KALO INOCULANT CO. **QUINCY, ILL.**

STOCKS OF SOYBEANS, JULY 1, 1947, WITH COMPARISONS

Position	July 1 1945	July 1 1946	April 1 1947	July 1 1947
	— Thousand Bushels —			
On Farms	7,598	6,802	24,966	6,266
Int. M. E. & Whses.*	6,031	3,526	19,633	3,497
Processing Plants	26,387	22,753	41,970	28,005
Terminals	5,401	3,424	13,689	2,258
Steel & Wooden Bins	957	0	0	0
Total All Positions	46,374	36,505	100,258	40,026

* Excludes stocks in processing plants enumerated by the Bureau of the Census and commercial stocks at terminals reported by the Grain Branch, Production and Marketing Administration.

** Included in "Other States."

• SOYBEAN CRUSHING. Crushing of soybeans the first 9 months of the 1946-1947 season was the largest on record, reflecting the urgent demand for oil.

Despite the highest crushing rate on record, disappearance of soybeans in the first 9 months of the current season was 1.7 million bushels less than last year and amounted to 161 million bushels. This smaller disappearance was due to the sharp drop in the use of soybeans for feed.

Crushing of soybeans for oil, as reported by the Bureau of the Census, totaled 135½ million bushels for the first three quarters of the 1946-1947 season. This is 10 million more than was crushed in the same months of 1945-1946 and 20 million bushels above the same months for 1944-1945.

Crushing of soybeans in the April-June quarter totaled 44.3 million compared with 49.6 million in the January-March quarter and 40.0 million bushels in the April-June 1946 quarter. Exports, October through June this season, totaled 3 million bushels compared with 2.7 million in the same months of 1945-1946.

• SOYBEAN INSPECTIONS. Inspected receipts of soybeans increased somewhat in July with a total of 1,728 cars compared with 1,521 cars in June, according to inspectors' reports to the grain branch of the Production and Marketing Administration. The average for the month of July for the crop years 1940-45 was 2,511 cars. Inspected receipts October through July this season were 82,197 cars compared with 82,367 cars for the same period last year.

The quality of the soybeans inspected in July was somewhat higher than for the preceding month, 67 percent grading No. 2 or better compared with 60 percent in June. Of the October-July receipts this year 70 percent graded No. 2 or better compared with 92 percent last season.

Inspections of soybeans in July included truck receipts equivalent to about 88 cars.

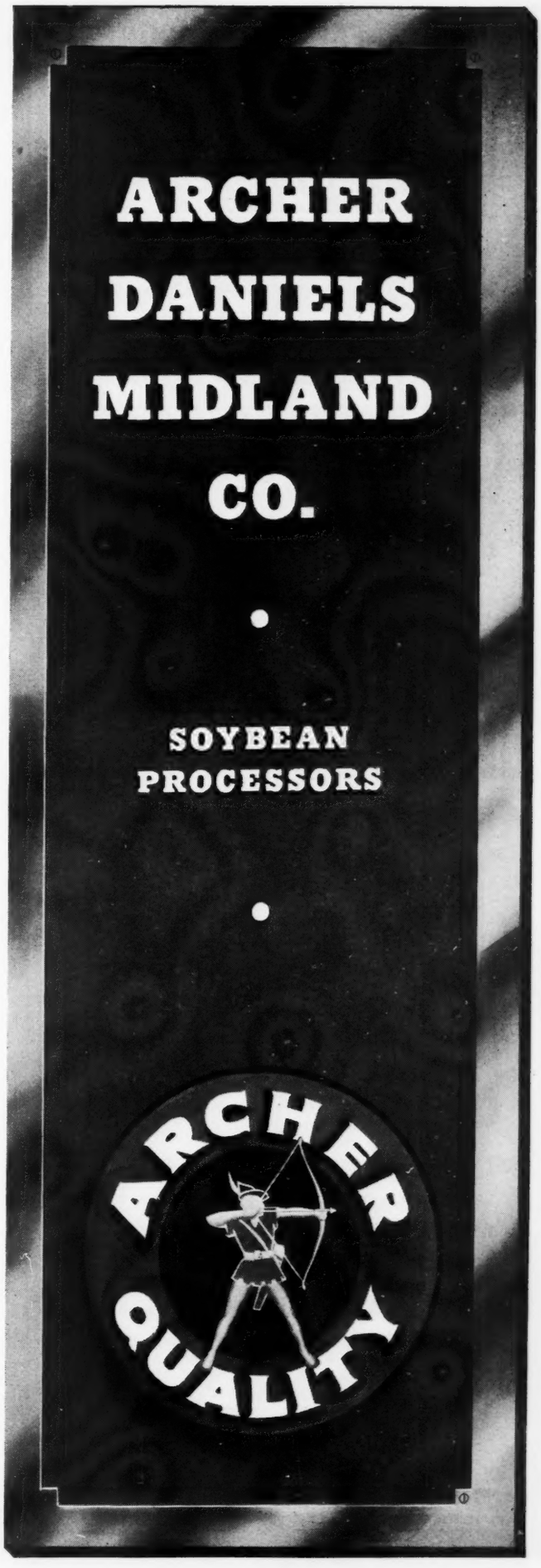
• COMMERCIAL SOYBEAN STOCKS. Production and Marketing Administration's commercial grain stock reports for August.

U. S. SOYBEANS IN STORE AND AFLOAT (1,000 bu.)

	Aug. 5	Aug. 12	Aug. 19	Aug. 25
Atlantic Coast	51	33	27	14
Northwestern and Upper Lake	154	131	149	119
Lower Lake	95	79	71	71
East Central	149	77	113	221
West Central				
Southwestern & Western	179	148	123	102
Total current week	628	468	483	527
Total year ago	1,745	1,439	1,137	824

• STANDARD SHORTENING SHIPMENTS. Reported by members of Institute of Shortening Mfgrs., in pounds.

August 2	5,542,296
August 9	5,539,252
August 16	5,331,419
August 23	4,895,097
August 30	5,740,684



A GOOD FERTILITY PROGRAM

Is Essential With Soybeans

Soybeans are a profitable crop. They have the faculty, however, of extracting top-soil plant foods in a thorough way and crops following them may reflect this withdrawal. Plan for all of the crops of the rotation by making clover a part of it and broadcasting one thousand pounds an acre of either

TOP YIELD or FOUR LEAF
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before seeding. Hay, seed, grain and beans in turn will then each afford high yields and soil fertility will be maintained. Write for more information.

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Soy Products Inc.

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We Are Buyers of Soybeans

• SOYBEAN GLUE IN PLYWOOD. Soybean glue consumed by the softwood plywood industry in June totaled 2,139,000 pounds, reports Bureau of the Census. This compares with 2,207,000 pounds in May, and 1,879,000 pounds in June of 1946.

Other glue consumption in June: casein 369,000 lbs.; phenolic resin 2,712,000 lbs.; other 235,000 lbs.; total 5,455,000 lbs.

Glue stocks at the end of June: casein 339,000 lbs.; soybean 1,252,000 lbs.; phenolic resin 1,280,000 lbs.; other 408,000 lbs.; total 3,279,000 lbs.

Government Orders

• OIL ALLOCATIONS. The U. S. Department of Agriculture has announced the allocation of 47½ million pounds of liquid oils for immediate export to a number of countries, against tentative allocations for the fourth quarter of 1947.

The allocations, which are made to meet urgent requirements abroad, are in line with recent recommendations of the International Emergency Food Council. Included are 5.5 million pounds of peanut oil, 22.3 million of soybean oil, 11 million of cottonseed oil, and 8.8 million of fish oil.

The breakdown of the soybean oil allocations in millions of pounds is as follows:

Czechoslovakia, 2.2; Canada, 3.3; France, 3.3; Netherlands, 3.3; French Colonies, 2.2; Latin America, 2.5; Denmark, 3.3; and Norway, 2.2.

• 1947 SUPPORT PROGRAM. The U. S. Department of Agriculture announced that under the 1947 soybean price support program lending agency agreements similar to those in effect in 1946 would be offered by the Commodity Credit Corporation to private lending agencies and soybean processors. These agreements, by providing protection against losses to processors and private lending agencies, make it possible for processors to purchase soybeans from farmers as soon as their crops are harvested. This is of particular importance to the many farmers who lack equipment to store soybeans.

The major provisions of the agreements are summarized below:

1. To be eligible for loans, processors must pay not less than support prices for all 1947 crop soybeans and shall not purchase in excess of their crushing requirements to October 10, 1948.

2. Private lending agencies shall advance their own funds to processors on security of soybeans and at values determined on the basis of support prices. Loans shall bear interest at 3 percent per year and shall be payable on demand or on August 1, 1948 — whichever is earlier.

3. Half of the interest collected by the lending agency shall be remitted to CCC. CCC will take over loans on request of the lending agency.

4. Any soybeans purchased by processors and placed under loan shall be purchased by CCC upon written request made not later than August 1, 1948.

5. CCC may request certification from processors of the amount of unsold soybeans under loan and may require processors either to sell to CCC the unsold soybeans or to repay all loans on them.

Interested persons may obtain copies of the 1947 lending agency agreements by writing to the Commodity Credit Corporation office at 623 South Wabash Ave., Chicago 5, Ill.

The Department of Agriculture announced on February 27, 1947 that "the farm price of 1947-crop soybeans grading U. S. No. 2 and containing 14 percent moisture will be supported at $2.04 per bushel for green and yellow varieties and $1.84 for brown, black, and mixed varieties."